

NAINI-TAL.

HYDRO ELECTRIC SCHEME

Revised Estimate.

II. Division, P. H. Deptt:

Estimate No. 12 1921-22

Allahabad.

Amount Rs 20,73,387/-

(A)

UNITED PROVINCES.

PUBLIC WORKS DEPARTMENT.

Naini Tal District Second. Division. P.H. Deptt:

Estimate no. 12, framed by Mr. F.D. Tunnicliffe,

Executive Engineer, of the probable cost of Hydro-Electric Scheme.

Naini Tal.

Date January 1922.

Amount of this estimate. Rs. 20,73,387/-

Reference number on plan.	List of plans accompanying Subject matter of plan.	Index of contents.	Pages.
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5	-do- Sukha Tal -do-	Detailed specification	
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23	Thrust block of power pipe line.		

REFERENCES.

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No.	Date.	From	To	Brief abstract.
				According administrative approval of the project when approximate estimated cost of Rs.

No. 639/VIII-6, dated 23-2-22.

From G. McC. Howy Esqr.,
Superintending Engineer,
P.H. Deptt., U.P.

To The Chairman,
Municipal Board,
Naini Tal.

Sir,

I have the honour to enclose herewith the revised estimate and plans for Naini Tal Hydro Electric and Water Supply Improvements, amounting to Rs20,387 lakhs.

In the reports attached to this estimate explanations are given showing how the large excess has been caused, and if any point is not clear, the Executive Engineer will be glad to explain details to your Board on your fixing a date.

The Executive Engineer informs me that allotments are almost exhausted and that large liabilities will have to be met as soon as the material at present in Calcutta is delivered at Kathgodam. I would therefore request that you will kindly take steps to put at that Officer's disposal the requisite funds to meet the bills. The Executive Engineer will inform you direct of the approximate amounts he requires and the dates on which he anticipates the liabilities will have to be met.

I have the honour to be,

Sir,

Your most obedient servant

Ed. G. McC. Howy.

Superintending Engineer,

P.H.D., Allahabad.

No. 560/7111-6, dated the 23rd February 1922.

Copy of the foregoing forwarded to the
Executive Engineer, II Division, for information
with reference to his No. 564 dated the 17th instant.
A copy of forwarding note and a statement of analysis
on the original and revised estimate is also enclosed.

Sd. G. McC. Hoey.

Superintending Engineer,

P.H. Deptt. Allahabad.

TRUE COPY.

NAINI TAL HYDRO ELECTRIC SUPPLY.

Note by Superintending Engineer,
Public Health Deptt., U.P.

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Several reports have already been made concerning the large excess anticipated on this work, but owing to the difficulty in obtaining correct figures and delay caused by recent changes of staff, it has not been found possible to complete the revision of the estimate until now. The original and revised estimates are attached herewith and may be fairly analysed as shown on page 5 above.

- (2) Other comparative statements are attached in the revised estimate giving details of the excess item by item.

Of the original estimate a sum of rupees 7.74 lacs was provided for overseas materials. The actual cost of this material estimate at 1/3 exchange, is now Rs13.68 lacs. In these figures centage charges are not included. (The net excess for overseas materials is therefore, Rs 5.94 lacs, exclusive of fees. The original estimate was drawn out on an exchange rising, and the orders were placed when the rupee was of 1s.6d when the rupee was about 2s. and still rapidly rising. A difference in exchange of 1/3 to 2/- operating alone would cause an excess of about Rs4.66 lacs).

- (3) Unfortunately owing to the trade boom in Europe immediately after the War, no firm could be found willing to quote, except on an Exchange and a Cost Variation Clause to guard against the ever increasing labour and material prices. To the excess due to exchange an amount due to the increased cost of material and labour in Great Britain must be added.

The total net excess of Rs95.94 lacs cannot be accurately apportioned between exchange and labour and material costs until the Audit Certificates of Manufacturers Workshop costs are received.

It should be remembered that no firm quotations could be obtained for any manufacturer until the commencement of the slump towards the end of 1920.

(4)

The total excess on overseas materials as above stated, amounts to about 5.94 lacs. The total excess on all works, including fees, amounts to Rs9.34 lacs.

If fees and contingencies are excluded the nett excess on all works is about 8.40 lacs leaving a balance of about Rs2.46 lacs, which excess cannot be explained by exchange or by price variations in home materials.

(5)

This excess is explained by

- (a) rise in local rates.
- (b) increased accommodation at Water-works pumping station.
- (c) bridges and piers which were unforeseen and found necessary during construction of power pipe line.
- (d) certain unforeseen works.

The amount included under (a) and due to rise in local rates is estimated to be about Rsone lakh, or over sixty per cent on an average above the rates scheduled early in 1919.

(6)

The cost under (b) is due to the new building found necessary to house the extra sets considered necessary and a substantial retaining wall necessitated by a slip on the hill side behind the pumping station. The extra cost involved to this amounts to Rs 52,000/-.

The cost under (c) is due to the increased number of piers required to support the power pipe line, and bridges over the nullah near the Power Station. The number of supports was seriously underestimated and until the foundations in the hill side were excavated the quantities of masonry included were not realised. It must also be remembered that this masonry had to be paid for at very high rates. The amount involved under this head is between Rs70 to 80 thousand.

7. Under (d) an amount of about Rs16,000 is involved. This includes works establishment Rs6,640, and the balance is made up of temporary buildings for storage of petrol, a motor lorry shed, a shelter for temporary pumping plant at Tallital, and cooly huts.

8. The excess on the sanctioned estimate has a most serious effect on the running expenses of the supply and will postpone for perhaps two or three years the date at which the supply will become profit earning. The cost per unit generated will now amount to annas 3.25 against the original estimate of annas 2.55 per unit with the supply in full working.

A reasonable anticipation of profits with the supply in full working is now about Rs39,000 against the anticipated Rs70,000 in the original profit.

9. The local work is nearing completion and will be finished in March. Advice has been received from the Manufacturers that all the plant is either on the sea or has been delivered ^{at} in Calcutta. Large consignments are at present held up at the docks owing to the strikes a date for completion is therefore a difficult matter to forecast, but in the event of the plant being all put on rail before the end of this month, it might reasonably be anticipated that energy will be available to the public by the end of April next.

10. The total expenditure to date is about Rs7.00 lacs and large liabilities are outstanding. The allotments to date have almost ^{all} been used ^{up}, and the provision of further funds at an early date is essential.

Sd. G. McC. Hoey,
Superintending Engineer,
Public Health Department,
United Provinces.

MAIN TAIL HYDRO ELECTRIC SUPPLY.

ORIGINAL ESTIMATE

REVISED ESTIMATE.

ITEMS	Overseas Works Rs	Local Works. Rs	Totals Rs	Overseas work. Rs	Local works. Rs	Totals Rs
Power Station Equipment	155,400.	-	155,400.	231,311.	-	231,311.
Power Pipe Line	195,000.	20,025.	215,025.	385,151	120,000	503,151
Transmission & Distribution	237,761	40,000	277,761	440,000	85,000	525,000
Substation Equipment	60,420	6,000	66,420	90,000	7,192	97,192
Pumping Station Equipment	125,436	6,000	131,436	223,813	16,000	239,813
TOTALS	774,017	72,025	846,042	15,68,275	228,192	15,96,467
Power Station Buildings	-	-	50,713	-	-	72,709
Substation Buildings	-	-	10,842	-	-	17,177
Pumping Station Building	-	-	9,600	-	-	63,625
Unforeseen Items	-	-	-	-	-	15,219
TOTALS	-	-	92,597	-	-	17,65,287
Compensation for trees	-	-	3,000	-	-	-
Contingencies	-	-	92,260	-	-	85,982
Fees	-	-	121,782	-	-	222,148
			11,39,639			20,73,387

Sd. C. McC. Roey
Superintending Engineer,
P.H. Deptt. Alwar.

NAINI TAL HYDRO-ELECTRIC SCHEME.

Revised Estimate.

Note by Mr. F.D. Tunnicliffe, Executive Engineer, II Division, Public Health Deptt:

It was the intention of Mr. S.E. Platt late Executive Engineer, II Division, P.H.D to submit Report with Revised Estimate on the Naini Tal Hydro-Electric Scheme, to the Superintending Engineer, Public Health Department, some time during the month of November 1921. Unfortunately Mr. Platt had to go on leave, at a moment's notice, on urgent private affairs, and he was not in a position to complete the work he had started, previous to leaving the country.

Mr. Platt had prepared, in draft, a Report not quite completed which is attached, and had also gone through the Revised Estimate which had been prepared by Mr. I. Walker Assistant Sanitary Engineer, to the Govt., who has also left the country, and had corrected some where necessary.

Mr. Platt had been in charge of the construction of the work since its commencement, and Mr. Walker late Assistant Sanitary Engineer, had also been engaged on this work for the period he was in the country, that is from Dec. 1920 to Oct. 1921. Both these officers were "an fail" with the work and I submit the Report and Revised Estimate with little comment and alteration.

It has been necessary to make a certain number of minor alterations to the estimate as it has been found that the number of

pillars allowed for, to support the Pipe Line, were not sufficient and several other little items had also not been included. These corrections have been made in the Revised Estimate submitted herewith.

Briefly, the original estimate amounting to Rs 11,39,639/- is not sufficient to cover the cost of the work, due to reasons given in Mr. Platt's Report. The Revised Estimate amounts to Rs20,73,387/-

I submit the Report with the Revised Estimate for favour of early sanction.

Sd. F. D. Tunnicliffe

16.2.22.

Executive Engineer,

II Division, Public Health Department.

NAINI TAL HYDRO-ELECTRIC SCHEME.

REVISED ESTIMATE.

Report by S.E. Platt Esqr., Executive Engineer, II Division, Public Health Department.

The estimate for this work was sanctioned in G.O. No. 505C/1140W, dated the 10.5.20. for Rs 11,39,639/- and work was started in September, 1920.

In sanctioning the estimate certain changes were made in the arrangement of the pumping plant which rendered it impossible to house the new pumps in the old filter house building. The sum of Rs9000/- had been provided for alteration to this building but this sum proved quite inadequate to cover the cost of the new pump house.

Owing to the confined space available the filter house had to be dismantled and the new pump house built on this side after an expensive retaining wall had been built against the hill side to provide the extra space required. The extra cost of the building caused by this change in the arrangement of the pumping plant amounts to Rs 52,435/-.

When work was started, all building work was in the charge of the District Engineer Naini Tal, the high tension line and distribution system in the charge of Mr. Bell, Electrical Engineer, Mussorie and the remainder of the work in the charge of this division. In addition payments for all works were made by this division against the certificates of the

officers concerned.

Tenders for all building work were called for by the District Engineer, Naini Tal and were accepted by the Chief Engineer. In consequence of the general increase in all rates during the period 1918-21 the rates in the accepted tenders were considerably higher than the rates in the sanctioned estimate with the result that there is an excess amounting to Rs 7,68,336/- due to increased rates.

The arrangements for the supervision of the erection of the buildings did not prove very satisfactory so on the arrival of five Assistant Sanitary Engineers from England in December, 1920 the District Engineer Naini Tal was relieved of this work and the entire supervision of all work, except that done by Mr. Bell was handed over to this division.

The principal cause of the large excess in this estimate is the fall in the rate of exchange and the general increase in manufacturers prices since 1919. The estimate was prepared in the summer of 1919 when the rupee exchange was about 1/8 and the orders for plant and materials were placed in June 1920 when exchange was about 2/-.

Owing to the unstable prices for materials and the constantly varying wages of labour no firms would accept orders at that time except subject to a price variation clause dependant on the costs of materials and labour. Since the orders were placed the cost of labour and materials first rose and then fell and the exchange dropped steadily.

steadily until the rupee was worth little more than $1/5$. The greater part of the materials for the high tension line distribution system, and ~~power~~^{power} pipe lines ~~has~~^{have} been paid for at exchange rates varying from $1/5\frac{1}{3}$ to $1/3\frac{1}{2}$ for material which the manufacturers purchased at the top of the market ~~rate~~. The exchange now shows some signs of recovering and to day stands at about $1/5$. It is hoped that it may be possible to pay for the generating & pumping Plant at this or a higher rate of exchange ^{so} and so effect some saving in this estimate which is based on an exchange of one shilling and three pence to the rupee.

Note:-

This report was drafted by Mr. Platt late Executive Engineer, II Division, Public Health Department, between the 1st and 15th October 1921. I submit it without alteration of comment.

Sd. F. D. Tunnicliffe
16/2/22.

Executive Engineer,
II Division,
Public Health Department.

Maini Tal Hydro-Electric Scheme.

Estimate of running expenses.

1. Sinking fund & Interest on a Capital of Rs 17,16,474 less grant of Rs 3,00,000 @ 6 % per annum compound interest repay- able in 30 years. $7.265 \times 14,164.74$	Rs1,02,907/-
2. <u>Staff.</u>	
One Electric Engineer @ Rs 800 p.m. Rs 100 Horse Allowance Rs 50 Convey- ance allowance	950-0-0
One Power Station Asstt: @ 400 p.m.	400-0-0
Three oilers @ 25/-	75-0-0
One cleaner @ 15/-	15-0-0
One fitter @ 75/-	75-0-0
One Head Lineman @ 75/-	75-0-0
Four Linesman @ 30/-	120-0-0
Three sub-station Attendants @ 25/-	75-0-0
One Chowkidar @ 15/-	15-0-0
Two Beldars @ 12/-	24-0-0
One Mats @ 15/-	15-0-0
One peon @ 12/-	12-0-0
One Clerk @ 70/-	70-0-0
One Store Keeper @ 60/-	60-0-0
One Sweeper @ 15/-	15-0-0
	<u>Rs1996-0-0</u>
1,996 x 12 Rs 23,952-0-0 per annum.	
3. <u>Materials.</u>	
Lubricant Waste & Transformer oil at 2/- per 1,000 units generated.	1,400-0-0
Stationery & Printing charges @ 15/- per M	180-0-0
	<u>Total Rs1,588-0-0</u>

MAINT TAL HYDRO-ELECTRIC SCHEME.

4. Repairs.

Building @ 1% on Rs89,886	1348-0-0
Machinery @ 3% on Rs 3,28,503	9855-0-0
Over head lines 1/5% on Rs 525,000	1050-0-0
Power pipe lines 1/2% on Rs503,151	2516-0-0
Total Rs	14769-0-0

5. Rent for Telephone line & connection 200-0-0

Summary of Running
expenses.

1. Sinking Fund and interest	1,02,907-0-0
2. Staff	23,952-0-0
3. Materials	1,538-0-0
4. Repairs	14,769-0-0
5. Rent	200-0-0

Total Rs 1,43,416-0-0

Total units delivered per annum 704,436-0-0

Cost per unit 3.25 annas.

Estimate of Revenue.

1. Public Lighting

98,550 units @ 3.0 annas 18,478-0-0

2. Private Lighting &c.,

292,626 units @ 6.0 annas 1,09,734-0-0

3. Power for pumping

265,060 units at 3.0 annas 47,824-0-0

4. Power for heating and cooking

(winter only) 58,200 units @ 2.0 annas 7,278-0-0

1,83,311-0-0

The estimated annual income will be Rs1,83,311/- & the estimated annual profit will amount to Rs(1,83,311/- Rs1,43,416) giving an income of Rs39,895/- when maximum amount of current is taken.

Sd. F.D. Tunnicliffe. 16/2/22.

Maini Tal Hydro-Electric Scheme.Water Supply Arrangements.Estimate of running expenses.

1. Sinking fund and interest charges on a capital of Rs3,56,913 @ 6% compound interest repayable in 30 years =
 3569.13×7.265 25,930-0-0

2. Staff.

Allowance to Electrical Engineer for general

Supervision @ Rs100/-	100-0-0
Water Works Supdt: @ Rs300/-	300-0-0
One Head Mistri @ Rs80/-	80-0-0
One Oiler @ Rs25/-	25-0-0
One cleaner @ Rs15/-	15-0-0
One Chowkidar @ Rs15/-	15-0-0
One pipe line Inspector @ Rs100/-	100-0-0
One Sweeper @ Rs15/-	15-0-0

Total Rs 650-0-0

$650 \times 12 = \text{Rs}7800 \text{ per annum.}$

3. Power required for pumping.

255,060 units @ 3,00 annas per annum 47,824-0-0

4. Materials.

Lubricants & Waste @ 2/- per 1,000 units consumed 510/-
 Stationery Printing & water test charges @ 20/- 240/-
 Total Rs 750/-

5. Repairs.

Buildings @ 1½% on 63,685 955-0-0
 Machinery @ 3% on 1,74,761 5,243-0-0
 Pipe line Say 500-0-0

Total Rs 6,698-0-0

Summary of Running Expenses.

1.	Sinking fund and Interest	Rs	25,930-0-0
2.	Staff charges		7,800-0-0
3.	Power charges		47,824-0-0
4.	Materials		750-0-0
5.	Repairs		6,698-0-0

Total Rs 89,002-0-0

Number of gallons pumped $(120 \times \frac{1}{2} \times 182) \times 22,000 \times 15$

$\frac{1}{2}$ 69.63 millions

Cost per 1,000 gallons 20.45 annas.

If sinking funds and interest on previous loan

(Rs23,014) is added total annual charges Rs1,12,016/-

Cost of water per 1,000 gallons = 25.73 annas.

Sd. F. D. Tunnicliffe

16.2.22.

Executive Engineer.

A. 10. 8

Maini Tal Hydro-Electric Scheme.

Revised Estimate

Final Abstract.

Hydro Electric Scheme	17,16,474/-
Water Supply Alteration.	* 3,56,913/-
Grand Total Rs	20,73,387/-

Note:-

1. This figure does not include any money for Land or Tree compensation.
2. The rate of exchange is taken as Rs. 1/- = 1/3 (one shilling and three pence).
3. The amount of Rs6,579/- as cost of Temporary buildings would be credited to the estimate, if Maini Tal Municipality agrees to taking the buildings over.
4. No contingencies have been allowed on the works which are completed.
5. An amount of Rs360/- for the employment of a temporary clerk for a period of 6 months by the Maini Tal Municipality has been included in this estimate at the request of the Secretary Maini Tal Municipal Board.

Sd. F.D. Tunnicliffe.

16.2.22.

Executive Engineer.

II Division, P.H. Deptt.

Maini Tal Hydro-Electric Scheme.Abstract of Cost.

1.	Power Station Buildings	Rs 72,709/-
2.	Power Station Equipment	2,31,311/-
3.	Power pipe line	5,03,151/-
4.	Transmission & Distribution	5,25,000/-
5.	Sub-Station Buildings	17,177/-
6.	" " Equipment	97,192/-
7.	Temporary Buildings	6,579/-
8.	Work Establishment	8,239/-
9.	Temporary clerk for Maini Tal Municipality 6 months @ Rs60/-	360/-
10.		
	Total Rs	14,61,759/-
10.	Add contingencies 5% on 14,16,146 (see note 4. page 13).	70,807/-
		15,32,566/-
11.	Add S.E.'s fee for preparation @ 2%	30,651/-
12.	Establishment T & P &c., @ 10%	1,53,257/-
	Rs	17,16,474/-

For details see page 16-23.

Sd. F.D. Tumieliffe.

16.2.22.

Executive Engineer.

Naini Tal Hydro-Electric Scheme.

Abstract of cost for alteration and additions to
Water Supply.

1.	New pumping Station.	63,685-0-0
2.	" " " Equipment	2,39,813-0-0
3.		
	Total Rs	3,03,498-0-0
3.	Add 5% Contingencies	15,175-0-0
		3,18,673-0-0
4.	Add S.E's fees 2%	6,373-0-0
5.	Establishment 10%	31,867-0-0
	Total Rs	3,56,913-0-0

For details see pages 24-25.

Sd. F.D. Tunnicliffe.

16.2.22.

Executive Engineer.

MUNICIPAL OFFICE
NAINI TAL

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MUNICIPAL OFFICE
NAINI TALL

July 1921

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Revised Estimate.

S.E. 14.

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF As taken from Mather & Platt's Tender, Power House
Equipment.

Description of work.	Quantity.	Rate.	Amount Rs.	Total Rs.
3 Felton Wheels complete			51,204	
No. 3 Alternators & Excitors complete			66,542	
Main Switch board Transformers & Lighting Arrestors all complete			57,590	
W.I. Crane Overhead Complete			6,464	
Spars for alternators			3,148	
Connections between Alternators and Excitors &c, Flour plates and accessories Complete			6,453	
		1/54	191,401	
		1/3	223,301	
Ten lighting points with connec- tion complete			1,000	
Office Furniture			750	
Workshop Equipment			5,000	
Lee Recorders complete			1,260	
			2,31,311	
		Sd. F.D. Tannioliffe		
		16.7.22		
		Executive Engineer.		

MUNICIPAL OFFICE
RAINI TAL

1931

Maini Tal Hydro-Electric Scheme.

S. B. No. 14.

ESTIMATE OF Transmission and Distribution.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
1. Hard Drawn high conduction copper wire			4,40,000	
2. Over headwork			55,000	
3. Carriage of above			30,000	
4. Erection				5,25,000/-
For details see page 38				
Sd. T.D. Tunncliffe.				
16.2.22.				
Executive Engineer.				

Maini Tal Hydro-Electric Scheme.

S. E No. 143

ESTIMATE OF Sub-Station Buildings.

Description of work.	Quantity.	Rate.	Amount Rs.	Total Rs.
1. Sakhe Tal Sub-Station			8,598	
2. Katchery Bugh " "			8,579	
			17,177/-	
For details see page 39-40.				
		Sd. F.D. Tunnicliffe	16.2.22.	
		Executive Engineer.		

ESTIMATE OF Sub-Stations, Equipment.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
Sub-Station Equipment.				
No. 1 H.T. Line and feeder apparatus do Control Panel Transformer equipment's lighting arrestors			20,123	
No. III -do- -do- -do-			20,123	
No. III -do- -do- -do-			30,645	
No. 3 Elliott Type recording Voltsmeters.				
" " -do- -do- simeters			6,795	
" 2 Tachometers			77,686	
" 3 Morris Ltd Wormgear Pully Block		1/5 1/3	90,632	
Six lighting points @ 60/-			360	
Add for erection for above			3,500	
Take out arrangement for two lines @ 200/-			600	
Add for erection of above			2,100	
			27,192/-	
		Ed. F. D. Turnbull		
		16.2.22.		
		Executive Engineer.		

Maini Tal Hydro-Electric Scheme.

S. R. No. 14

ESTIMATE OF Cost of Buildings constructed temporarily & to be handed over to Municipal Board after completion of work.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
1. Coolies Quarter sheds			3178	
2. Petrol cell			1529	
3. Chowkidar shed for above			855	
4. Lorry shed			2017	
			Total Rs.	6,579.
For details see page 41-44.				
			Sd. F.D. Tunncliffe	
			16.2.22.	
			Executive Engineer.	

ESTIMATE OF New Pumping Station Buildings.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
1. Pumping Station New Buildings			61,352	
2. Chamber over pipes outside			2,333	
				63,685/-
For details see page	45-46			
		Sd. F.D. Marncliffe		
		16.2.22.		
		Executive Engineer.		

Naini Tal Hydro-Electric Scheme.

S. H. No. 144

ESTIMATE OF Pump House Equipment.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
High zone pumping plant complete			62,616	
Intermediate -do- -do-			32,819	
Low -do- -do- -do-			29,480	
Suction pipes for tree zone pumps complete and Air vessels to High zone pumps.			11,430	
Cables, Floor Plates &c.			6,142	
Over head crane			6,464	
		1/5 1/2	148,951	
		1/3	174,301	
Six lighting points complete			450	
Rising Mains @ Ex: 1/3			47,041	
Add for laying Carting & Railway			15,201	
Add for Specials Valves &c 6% on 47,000			2,820	85,082.
			2,39,812/-	
		Sd. T.D. Tunnickliffe	16,2,22	
		Executive Engineer.		

Naini Tal Hydro-Electric Scheme.

S. E. No. 14)

RevisedESTIMATE OF Power House Building. (Power Station)

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Hill cutting	70078Cft	22/-	%	1541	
2. Excavation	18864Cft	14/-	%	264	
3. Lime concrete	2451Cft	47/-	%	1155	
4. P.C. concrete	1389Cft	183/-	%	2542	
5. R.S. Lime masonry	27559Cft	51/13	%	14278	
6. R.C. concrete including iron work	1148Cft	3/8	cft	4018	
7. Cement rendering	1903Sft	22/-	%	419	
8. Paripan coating	1653Sft	9/-	%	149	
9. Iron work of trusses including fixing as per bill				4300	
10. Lime pointing	9629Sft	4/9	%	439	
11. Charwood work	48.166ft	3/4	cft	157	
12. Sliding door as per bill	2 No.			500	
13. Chir wood door leaves	5258ft	2/4	sft	1181	
14. Stone paving	7508ft	48/-	%	360	
15. Iron sheeting including labour of fixing	3154Sft	65/-	%	2050	
16. Ridging	218Rft	1/1	Rft	232	
17. Lead sheeting	72Sft	65/-	%	61	
18. Painting & Varnishing	1403Sft	7/8	%	105	
19. Painting to iron trusses	1 Job	L.	S.	70	
20. Earth filling	2533Cft	14/-	%	37	
21. Saucer drain	2112Sft	-/10/-	Rft	1320	
22. Site clearance	1 Job	L.	S.	90	35,265/-
For details see page	47-55				
		Sd. F.D. Pinnicliffe			
		16.2.22			
		Executive Engineer			

ESTIMATE OF Tail Race.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Excavation of inner side of power house	7448cft	14/-	%	104/-	
2. Hill cutting at the end of tail race	10000cft	22/-	%	22/-	
3. Cement concrete	1318cft	183/-	%	2412/-	
4. Cement masonry up to C.L.	2515cft	130	%	3270/-	
5. Lime masonry	11420cft	51/13	%	592/-	
6. R.C. Work including iron work	1700cft	3/8	cft	595/-	
7. Box Older pitching below the fall	1308ft	40/-	%	52/-	
8. Earth filling	381	14/-	%	5/-	
9. A. Saw wood planking	500cft	7/9	cft	378/-	
10. B. Chirwood frame of door	100cft	3/4	cft	33/-	
10. Cement plaster	13860cft	22/-	%	305/-	
11. Lime pointing	550cft	4/9	%	25/-	
12. Lime plaster	2450cft	8/8	%	21/-	
13. White washing	2450cft	-/10/16%		2/-	
14. Iron work	451bs	30/-	Mds	16/-	
15. 1 1/2 Chir wood work	398ft	2/4	sft	88/-	
16. Site clearance	1 Job	L.	S.	50/-	
					7950/-
Sd. J. D. Duttaliffe,					
13.2.28.					
Executive Engineer.					
For details see page 56-59.					

ESTIMATE OF Staff Quarters.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Excavation of foundations	4658cft	14/-	%	65/-	
2. R.S. Masonry in lime	11415cft	51/3	%	5843/-	
3. R.S. Masonry in clay	4197cft	46/-	%	1931/-	
4. Eiwari patent slates	368ft	1/12	sft	63/-	
5. R.C. Work including iron	164cft	3/8	cft	574/-	
6. Chir wood work	318cft	3/4	cft	1033/-	
7. 1½" chir wood planking	956sft	94/9	%	932/-	
8. ¾" chir wood planking	1731sft	30/5	%	525/-	
9. Lime pointing	29363ft	4/9	%	125/-	
10. Lime plaster	45343ft	8/8	%	385/-	
11. Coal-tarring	1 Job	L.	S.	15/-	
12. Site clearance	-do-			60/-	
13. White washing	45343ft	10/6	%	30/-	
14. Pannelled door leaves 1½"	2553ft	2/	sft	510/-	
15. Earth filling	8100ft	14/-	%	11/-	
16. Lime concrete	314cft	47/-	%	148/-	
17. Iron sheeting including labour of fixing	18060ft	65/-	%	1174/-	
18. Ridge	1518ft	1/9	Rft	236/-	
19. Iron work	348lbs	30/-	Mds	129/-	
20. Painting & Varnishing	4.31Mds	L.	S.	100/-	
21. Saucer drain	875sft	12/-	Aft	547/-	
22. Bill cutting	186190ft	22/-	%	4096/-	18,532/-
Sa. R. D. Tunnicliffe					
16.2.22					
Executive Engineer					
For details see page	60-64.				

ESTIMATE OF Superintendent's Quarter.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Excavation of founde	3038cft	14/-	%	43	
2. Lime masonry	4971cft	51/3	%	2545	
3. Cement masonry	328cft	130/-	%	4	
4. Clay masonry	1626cft	46/-	%	748	
5. R.C. Work including iron	113cft	3/8	cft	396	
6. Lime plaster	2855Sft	8/8	%	243	
7. Lime pointing	1894Sft	4/9	%	86	
8. Chir wood work	185cft	3/4	cft	601	
9. 3" planking for roofing	1836Sft	30/5	%	557	
10. Iron sheeting with cost of fixing	1836Sft	65/-	%	1193	
11. Ridge	102Sft	1/9	Sft	159	
12. Glazed & panelled doors & windows	272Sft	2/-	Sft	544	
13. Cement concrete filling	156cft	183/-	%	285	
14. Lime concrete filling	468cft	47/-	%	220	
15. Earth filling	1248cft	14/-	%	18	
16. Iron work	2Mds. 11Ssars	30/-	Md	68	
17. Site clearance	1 Job	L.	S.	30	
18. Painting & Varnishing		L.	S.	60	
19. Coaltaring		L.	S.	15	
20. Saucer drain	906Sft	-/10/-	Sft	566	
21. White washing	2855Sft	-/10/6	%	19	8400/-
For details see page	65-70				
		Sd. P. D. Thoncliff.		16.2.22	
		Executive Engineer			

ESTIMATE OF Sweepers Hut.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Excavation of foundations	520cft	14/-	%	7	
2. Hill cutting	1960cft	22/-	%	43	
3. Lime masonry	1027	51/3	%	525	
4. Clay masonry	5230cft	46/-	%	240	
5. Chir/wood work	22,190cft	3/4	cft	72	
6. 1/2" Planking	240Sft	30/6	Sft	73	
7. Ridgeing	32Sft	1/9	Rft	50/-	
8. Iron sheeting including fixing	240Sft	65/-	%	156	
9. Lime pointing	884Sft	4/9	%	40	
10. Lime plaster	404Sft	8/8	%	34/-	
11. Earth filling	1200cft	14/-	%	2/-	
12. Stone paving	300cft	48/-	%	14/-	
13. Site clearance	1 Job	L.	S.	50/-	
14. White washing	404Sft	10/6	%	3	
15. 1 1/2" door leave	54Sft	2/-	sft	108	
16. R.C. work including iron	13,130cft	3/8	cft	46/-	
17. Iron work	15.54	30/-	Mds	6/-	
18. Coaltering		L.	S.	10/-	
19. Painting & Varnishing		L.	S.	25	1504/-
For details see page 71-75					
Sd. F.D. Tunncliffe					
16.2.22					
Executive Engineer.					

Maini Tal Hydro-Electric Scheme.**ESTIMATE OF** cook house in connection with power house Supdt. Quarter.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. Excavation of foundations	352cft	15/-	%	5	
2. Rubble stone masonry in lime	538cft	51/3	%	275	
3. -do- -do- in clay	491cft	45/8	%	223	
4. R.C. Work including iron	110cft	3/8	cft	39	
5. Lime painting out side	351sft	4/9	%	16	
6. Lime plaster in side	395sft	8/8	%	34	
7. Chir wood work	2159cft	3/4	cft	70	
8. Iron work	64,921bs	30/-	Md	24	
9. Pannelled door & windows	398ft	2/-	sft	78	
10. 3" plank for roofing	272sft	30/5	%	82	
11. 22 B.W.G iron sheeting for roofing	272sft	65/-	%	177	
12. Stone paving in floor	44cft	48/-	%	21	
13. Earth filling in floor	44cft	14/-	%	1	
14. White washing	395sft	-/10/-	%	3	
15. Coal taring	1 Job	L.	S.	5	
16. Site clearance	1 Job	L.	S.	5	1058/-

For details see page 76-78

Sd. E. D. Tunncliffe

16.2.22.

Executive Engineer.

ESTIMATE OF Valve chamber at commencement of inlet pipe.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
		L.	S.		
1. Excavation in hard soil under road. with Belling out water	1 Job			500/-	
2. Cement masonry	894cft	145/-	%	1296/-	
3. Cement concrete	75cft	1/12	%	131/-	
4. Sal wood planking	32.25cft	9/12		344/-	
5. Iron straps	15 Nos	@ Rs2/- each		30/-	
6. R.C. Work including iron work	39cft	3 1/12 cft		146/-	
7. Site clearance	1 Job	L.	S.	10/-	
8. Cement pointing	367cft	15/-	%	55/-	
					2432/-
Sd. F.D. Tunnickiffe,					
16.2.22					
Executive Engineer					
For details see page	30.				

Naini Tal Hydro-electric Scheme.

ESTIMATE OF Inlet chamber & 20" intake connection from lake.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
1. (a) Excavation of hard rock & boulders with dismantling	16450cft	60/-	%	987	
(b) -do- for 20" intake pipes	33200 "	80/-	%	2656	
2. R.C. Concrete	3328 "	1/2/-	cft	4992	
3. Cement masonry	17507 "	130/-	%	22759	
4. Lime masonry	988 "	55/-	%	543	
5. Cement pointing	3393sft	12/-	%	407	
6. P.C. Fillet	56 cft.	1/8/-	cft.	34	
7. Cement plaster over fillet	173sft.	22/-	%	38	
8. R.C. work excluding iron	1662cft	3/2/-	cft.	5194	
9. Iron work	28 Wds.	30/-	Wd.	840	
10. Chir-wood planking	34 cft.	3/11/-	cft.	125	
11. Steps	68 No.	2/-	each	136	
12. Salwood shutters complete with rings and bolts.	165 cft.	3/4/-	cft.	536	
13. Puddle clay including carriage from Ayarpata.	2520 "	5/9/-	"	1418	
					40,715/-

For details see page 31-33.

Sd/- P. D. Tundeliffe,

16.3.22

Executive Engineer.

ESTIMATE OF thrust blocks & masonry of pillars for power pipe line.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
1. Excavation in soft & hard rock.	270542 cft	35/- %	9469	
2. Cement concrete	13931 cft	2/- cft	27862	
3. R.S. masonry in lime mortar	25402 cft	52/- %	13209	
4. -do- in cement mortar	29265 cft	130/- %	38045	
5. Cement plaster	4094 Sft	20/- %	819	
6. Cement pointing	25229 Sft	12/- %	3027	
7. Saucer drain	210 Rft	-/10/- Rft	131	
8. R.C. Work	140 cft	3/8 cft	490	
9. Dismantling & rebuilding) 2 Huts at Gangi Par }	L.S. 1 job for Rs. 150/- for each		300	
10. Bailing out water of thrust block founds in nala.	1 job	L. S.	200	93,552/-

For details see page 90 - 95.

Sd/ P. D. Tungiliffe.
16-2-22.
Executive Engineer.

ESTIMATE OF Power Pipe Line (steel & C.I. 10" main.)

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
Double 10" Steel Main &c for the necessary heads including Construction, Carriage, Laying and pointing complete also Screen for Inlet Chambers.				
Materials			1,75,275	
-do-			76,666	
Screen for inlet chamber			2,000	
Supervision			6,800	
Carriage and Laying			23,800	
Duty & labour at Calcutta			2,353	
			2,86,894	
Add 5% interest.			14,344	
			6,01,238/-	
Sd/ F. D. Tunnicliffe. 16-2-22. Executive Engineer.				

Revised.

S. H. No. 14.

ESTIMATE OF Sukha Tal Sub Station Building.

Description of work.	Quantity.	Rate.		Amount Rs.	Total. Rs.
		L.	S.		
1. Levelling site	1 Job	L.	S.	100/-	
2. Excavation	2817 Cft	16/-	%	46/-	
3. Lime concrete	870 Cft	35/-	%	305/-	
4. R.S.Lime masonry	7091 Cft	54/-	%	3829/-	
5. R.S.Clay masonry	548 Cft	48/-	%	263/-	
6. R.C.Concrete excluding iron work.	410 Cft	3/5	Cft	1358/-	
7. Cement concrete	58 Cft	2/6	Cft	137/-	
8. Stone Paving	140 Cft	33/-	%	46/-	
9. Lime plaster	697 Sft	9/-	%	63/-	
10. Cement rendering	464 Sft	12/-	%	56/-	
11. Lime pointing	5077 Sft	5/8	%	279/-	
12. Rammed earth filling	351 Cft	14/-	%	5/-	
13. White washing	697 Sft	10/6	%	5/-	
14. Panelled glazed door & windows leaves.	153 Sft	2/4	Sft	344/-	
15. Chir wood work	32,45 Cft	3	Cft	97/-	
16. 1" Chir wood Planking	288 Sft	7/-	Sft	126/-	
17. Iron sheeting including labour of fixing	398 Sft	65/-	%	259/-	
18. Painting & Varnishing	393 Sft	6/8	%	26/-	
19. Saucer drain	464 Sft	10/-	Sft	284/-	
20. Iron work	29 Mds.	30/-	Md.	870/-	
21. Coal taring	1 Job	L.	S.	30/-	
22. Site Clearance	1 Job	L.	S.	70/-	8598/-

Sd/ F. D. Tunnicliffe.

10-2-22.

Executive Engineer.

For details see page. 96-102.

Revised.

S. E. No. 141

ESTIMATE OF Katchery Bugh Sub-Station Building.

Description of work.	Quantity.	Rate.	Amount Rs.	Total. Rs.
1. Excavation	2021 cft	16/- %	32	
2. R.S. Masonry in lime	7008 cft	58/15 %	4130	
3. R.S.-do- in clay	548 cft	52/12 %	289	
4. R.C. Concrete including iron	410 cft	33/5 cft	1358	
5. Cement concrete	58 cft	2/8 sft	137	
6. Stone paving	140 cft	33/- %	46	
7. Lime plaster	697 sft	9/- %	63	
8. Cement rendering	464 sft	12/- %	56	
9. Lime pointing	5077 sft	5/8 %	279	
10. White Washing	697 sft	10/6 %	5	
11. Panelled & Glazed leaves for doors and windows.	153 sft	2/4 sft	344	
12. Chir wood work	32.45 cft	3/- cft	97	
13. 3" chirwood planking	288 sft	7/- sft	126	
14. Iron sheeting including labour of fixing	398 sft	61/11 %	246	
15. Painting & Varnishing	393 sft	6/8 %	26	
16. Coal taring	1 Job	L. S.	30	
17. Site clearance	1 Job	L. S.	93	
18. Iron work	28.33	30/- md.	850	
19. Saucer drain	231 sft	10/- sft	144	
20. Lime masonry for retaining wall.	169 cft	52/3/- %	88	
21. Cement pillars masonry.	9 cft	130/- %	12	
22. Reward pattern slates	16 sft	3/12 sft	28	
23. Round earth filling	7156 cft	14/- %	100	8579/-
For details see page 103-107.		sd/ F. D. Tunncliffe. 16-2-22. Executive Engineer.		

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF Coolies Shed.

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Hill cutting & excavation	2169Cft	16/-	%0	35/-	
2. Lime masonry	2041Cft	50/-	%	1021/-	
3. Lime pointing	1795Cft	5/8	%	99/-	
4. Earth filling	1860Cft	15/-	%0	3/-	
5. 1½" Chirwood leaves	69Rft	2/-	rft	138/-	
6. Chirwood doors & frames	66.27Cft.	3/11	cft	243/-	
7. Iron sheeting including fixing	365 Sft	61/11	%	534/-	
8. Ridging	60 Rft	1/4	rft	75/-	
9. Coaltaring i job		L.	S.	5/-	
10. Iron work 1 job		L.	S.	10/-	
11. Site clearance "				15/-	2178

For details see pages 108-109.

Sd/- F.D. Tunnieliffe
16/2/22.
Executive Engineer.

Naini Tal Hydro-Electric Scheme.

Revised.

ESTIMATE OF Petrol Cell.

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Hill cutting.	43520ft	25/-	%	109/-	
2. Lime concrete	2560ft	50/-	%	128/-	
3. Lime masonry	11870ft	62/-	%	136/-	
4. Arch masonry	1970ft	75/-	%	148/-	
5. Chirwood work	3.830ft	3/8	0ft	14/-	
6. 1" Leave panelled	12 sft	3/-	8ft	36/-	
7. Cement pointing	96 8ft	13/-	%	14/-	
8. Cement plaster	483 Sft	22/-	%	106/-	
9. Lime pointing	65 Sft	5/8	%	4/-	
10. Iron work	38 lbs	30/-	Md	14/-	
11. Earth filling.	574 Cft	20/-	%	115/-	
12. Painting & varnishing	1 job	L.	S.	8/-	
13. Coaltarling.	1 job	L.	S.	5/-	
14. Site clearance	-do-	-do-		20/-	
15. Saucer drain	96 Sft	112/	sft	72/-	1529/-

Sd/- F.D. Tunneliffe
16/2/22.
Executive Engineer.

For details see pages 110-111.

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF chowkidars shed in connection with Petrol Cell.

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Excavation of founds.	216 Cft	14/-	%0	3/-	
2. Lime masonry	677 Cft	62/-	%	420/-	
3. Chirwood work	16.33Cft	3/8	cft	56/-	
4. $\frac{3}{4}$ " Planking for roofing	237 Sft	30/5	%	72/-	
5. 1" Panelled door leave	13 Sft	3/-	Sft	39/-	
6. Iron sheeting for roofing	237 Sft	63/-	%	149/-	
7. Ridging	25 Rft	1/4	Rft	31/-	
8. Lime pointing	633 Sft	5/8	%	35/-	
9. Earth filling	22 Cft	20/-	%0	1/-	
10. Iron work	38lbs	20/-	Md	14/-	
11. Painting and varnishing	1 job	L.	S.	20/-	
12. Coaltarling	-do-	-do-		5/-	
13. Site clearance.	-do-	-do-		10/-	Rs.855/-

For details see pages 112-113.

Sd/- F.D. Tunncliffe,
16/2/22.
Executive Engineer,

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF Lorry Shed.

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Earth filling	5540cft	16/-	%	9/-	
2. Lime masonry	1950cft	52/-	%	102/-	
3. Lime concrete	4220cft	45/-	%	190/-	
4. Saucer drain	279Sft	-/8/-	Sft	139/-	
5. Chirwood work	100.310ft	3/11	2ft	370/-	
6. Iron sheeting including labour of fixing	1542Sft	56/-	%	864/-	
7. Ridging 22 G	54Sft	1/4/-	Rft	68/-	
8. Rammed concrete	4060cft	20/-	%	81/-	
9. Site clearance	1 job	L.	S.	10/-	
10. Cement pointing	279Sft	12/-	%	34/-	
11. 1½ Panelled door leave	15 Sft	2/-	Sft	30/-	
12. Coal taring		L.	S.	15/-	
13. Painting and varnishing		L.	S.	30/-	
14. Iron work		L.	S.	75/-	2017/-

For details see pages 114-115.

Sd/- P. D. Turniccliffe,
16/2/22.
Executive Engineer,

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF Pumping station Building.

Revised

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Dismantling of Roofing & wood work	Job	L.	S.	80	
2. Two iron tanks Cutting	one job	L.	S.	300	
3. Hill cutting	102740cft	25/-	%	2569	
4. Excavation	146470cft	15/-	%	220	
5. Cement concrete of retain- ing wall &c.	58660cft	3/-	cft	17598	
6. R.S.masonry in cement mortar	9150cft	130/-	%	1190	
7. -do- in lime -do-	343620cft	65/-	%	22335	
8. R.C.work including iron work	14470cft	3/8	cft	5064	
9. Cement concrete filled	15370cft	3/-	3 1/4	4611	
10. Lime concrete	3920cft	48/-	%	188	
11. Lime pointing	13701Lft	5/8	%	754	
12. Cement rendering	2265Lft	12/-	%	272	
13. Paripan coating	894Lft	2/8	%	22	
14. Chirwood work of frames	480cft	3/-	cft	144	
15. Doors and windows					
(a) Sliding door as per bill	1 job	L.	S.	250	
(b) Trap door -do-	1 job	L.	S.	60	
(c) Glazed doors & windows	503Sft	2/4	Sft	1132	
16. Iron work	3.6Md.	30/-	md.	108	
17. Iron steps	40 No.	2/-	each	80	
18. Manhole cover	1 Job	L.	S.	55	
19. Pulley Block	-do-	-do-	-do-	110	
20. Painting and varnishing	-do-	-do-	-do-	90	
21. Earth filling	20470cft	15/-	%	31	
22. Saucer drain	1388Lft	-/12/-	Lft	1037	
23. Site clearance	1 job	L.	S.	95	
24. Bailing out water	1 Job			350	
25. Iron work of girder	77.810wt	28/-	Cwt	2179	
26. Kharanja masonry	512 Cft	70/-	%	428	61,352/-

For details see page 116-129

Sd/- F.D. Tannidiffe.
16/2/22

Naini Tal Hydro-Electric Scheme.

ESTIMATE OF Pipe chamber at Pump House.

Description of work.	Quantity.	Rate.		Amount Rs.	Total Rs.
1. Excavation	2126Cft	15/-	%	32	
2. Cement masonry	4050Cft	130/-	%	527	
3. Cement concrete	360Cft	3/-	Cft	1080	
4. R.C.Work including iron	1220Cft	3/8	Cft	427	
5. Lime masonry	2730Cft	65/-	%	177	
6. Earth filling	240Cft	15/-	%	4	
7. Cement pointing	5038ft	12/-	%	60	
8. Cement plaster	218ft	22/-	%	5	
9. Lime pointing	1598ft	5/8	%	9	
10. Site clearnace	1 Job.	L.	S.	12	2,333/-

For details see pages 130-131

Sd/- F.D. Tunnicliffe,
16/2/22.
Executive Engineer.

N.P.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Revised estimate of Power House Building.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward						
1. <u>Hill cutting.</u>							
For levelling the site	1	100 $\frac{1}{2}$	95 $\frac{1}{2}$	70	53	20044	
	1	93 $\frac{1}{2}$	66 $\frac{1}{2}$	217	49	17722	
	1	30	25/3	3		1500	
	1	34	20	5/2		1700	
	1	30	21	15/2		2363	
For increasing space of pipes.	1	116	12	13		18096	
For levelling the site of recorder house.	1	32	30	3 $\frac{1}{2}$ /2		1680	
For retaining wall	1	108 $\frac{1}{2}$	2 $\frac{1}{2}$ 6 $\frac{1}{2}$	12		5383	
-do-	1	30	4x12			720	
-do-	1	29	5x12			870	
						70078	0ft.
2. <u>Excavation of founds.</u>							
Main long wall	2	86 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{5}{12}$		4902	
-do- end wall	2	18 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{5}{12}$		1051	
Long wall switchgallary	1	37 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{5}{12}$		1066	
End walls	2	8 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{5}{12}$		456	
Retaining walls	1	108 $\frac{1}{2}$	5 $\frac{1}{2}$ 7 $\frac{1}{2}$	8 $\frac{1}{2}$ 6 $\frac{1}{2}$		4940	
-do-	1	30	3 $\frac{1}{2}$	2 $\frac{1}{2}$		231	
-do-	1	29	3 $\frac{1}{2}$	3 $\frac{1}{2}$		381	
Over R. Wall	1	95	30	2		5760	13364 0ft.
N.P.							

FILE

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

Naini Tal Hydro-Electric Scheme.

MAN NEW No. 68, OLD 67.

(E)
DISTRICT.

49

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Power House building continued
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents, or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Brought forward ...							
5. Stone masonry in lime mortar up to Plinth.							
Long walls	2	85½	4½	½	575		
-do-	2	84½	4	½	508		
-do-	2	84½	3½	½	445		
-do-	2	84½	3	½	381		
-do-	2	84½	2½	2½	1059		
End walls	2	19½	4½	½	132		
-do-	2	20	4	½	120		
-do-	2	20½	3½	½	115		
-do-	2	21	3½	½	110		
-do-	2	21½	3½	2½	349		
Long wall switch gallery	1	30½	4½	½	123		
-do-	1	36	4	½	108		
-do-	1	35½	3½	½	93		
-do-	1	35	3	½	79		
-do-	1	34½	2½	2½	216		
End walls -do-	2	9½	4½	½	64		
-do-	2	10	4	½	60		
-do-	2	10½	3½	½	55		
-do-	2	11	3	½	50		
-do-	2	11½	3½	2½	144	4786	
Grand total						4786	

MAN NEW No. 68, OLD 67, 50

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work.

(for composite work). $\frac{1}{2}$

Power House Building continued.

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

[illegible]

PAGE _____

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work }
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

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Naini Tal Hydro-Electric Scheme MAN NEW No. 68, OLD 67,
(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Power House Buildings continued.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or c.p.h.			
	Brought forward						
Retaining wall	1	108 $\frac{1}{2}$	12 $\frac{1}{2}$	12	5546		
-do-	1	30	$\frac{4 \times 12}{2}$		720		
-do-	1	29	$\frac{5 \times 12}{2}$		870		
-do-	1	108	$\frac{12 \frac{1}{2}}{2}$	$\frac{14 \frac{1}{2}}{2}$	4908		
-do-	1x30	3 $\frac{1}{2}$	2 $\frac{1}{2}$		281		
-do-	1	29	3 $\frac{1}{2}$	3 $\frac{1}{2}$	381	29944	Cft
<u>Deduct</u>							
Opening in gallery	1	25	2	$\frac{15 \frac{5}{12}}{12}$	771		
door	2	8	2	11	352		
-do-	1	5	2	8 $\frac{1}{2}$	65		
Windows	13	4	2	5 $\frac{1}{2}$	572		
C.S.Window	21	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	295		
Lintel of doors	2	10	2	1 $\frac{1}{2}$	60		
-do-	1	7	2	1 $\frac{1}{2}$	18		
-do- of windows	13	5 $\frac{1}{2}$	2	1	143		
-do- C. -do-	6	5 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{3}$	32		
-do-	2	5 $\frac{1}{2}$	2	2 $\frac{1}{3}$	14		
-do-back & front	13	5 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{5}{12}$	48	2385	
						27559	
	Carried over						

(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work.

Power House Building continued.

(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or c. p. h.			
	Brought forward				...		
S.R.C. Concrete.							
R.C. Pillars	1	5	5	$\frac{1}{2}$	18.75		
-do-	1	$\frac{5+2\frac{1}{2}}{2}$	$1\frac{1}{2}$	1	3.38		
-do-	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$7\frac{1}{4}$	22.20		
-do-	1	$\frac{1\frac{1}{2}+1\frac{1}{2}}{2}$		$\frac{1}{4}$	0.56		
-do-	1	$1\frac{1}{2}$	$1\frac{1}{2}$	10	15.62		
Cap of pillars	1	$2\frac{1}{4}$	$1\frac{1}{2}$	1	4.37		
Beam	1	27	2	$2\frac{1}{6}$	117.00		
Under rail	2	$32\frac{1}{2}$	$\frac{2+2\frac{1}{2}}{2}$	$\frac{3}{8}$	139.95		
-do-	2	$82\frac{1}{2}$	$2\frac{1}{2}$	$\frac{5}{8}$	258.59		
Lintel over door	2	10	2	$1\frac{1}{2}$	60.00		
-do-	1	7	2	$1\frac{1}{2}$	17.50		
-do- window	13	$5\frac{1}{2}$	2	1	143.00		
-do- C.L. Window	6	$5\frac{1}{2}$	$1\frac{1}{2}$	$\frac{2}{3}$	31.50		
-do- doors	2	$5\frac{1}{2}$	2	$\frac{2}{3}$	14.00		
-do- window	13	$5\frac{1}{2}$	$1\frac{1}{2}$	$\frac{5}{12}$	42.66		
Beams of switch gallery	2	16	$\frac{1}{2}$	$1\frac{7}{12}$	38.00		
Stab on -do-	1	$36\frac{1}{2}$	$16\frac{1}{2}$	$\frac{3}{8}$	225.34	1147.92	Say 1143.11
Cement rendering middle wall							
main building long wall	2	$73\frac{1}{2}$		6	945		
-do- C. Wall	2	22		6	264		
N.P.							
	Carried over				...		

Figure 1 <https://doi.org/10.1371/journal.pone.0200007.g001>

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol., I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

Naini Tal Hydro-Electric Scheme.
(B)
DISTRICT.

MAN NEW No. 68, OLD 67.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Power House Building continued.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward						
Cement							
7. Rendering inside wall							
Main building Long wall	2	78½	.	6	945		
-do- C. Wall	2	22	.	6	264		
Switch gallery long wall	2	30	.	5	300		
-do- C. Wall	2	12	.	6	120		
Side of wing	2	2	.	6	24		
Projection	1	100	.	2½	250	1903 Sft	
8. Parian coating the same as drain No. 7.						1903	
Deduct item marked						250	1653 Sft.
9. Iron work for trusses, the same as per bill	1 job						4300/-
10. Lime pointing							
Inside long wall	2	78½	.	14½	2271		
-do- C. Walls	2	22	.	14½	634		
Gallery long wall	2	30	.	20	1200		
C. Walls	2	12	.	20	480		
Sides of opening	2	2	.	6½	26		
Jambs of door with lintel.	2x2	5	2	40	40		
Windows	2x1	2½	2		10		
	2x1½	2	2½		234		
Cable	2	22	3½		165		
Retaining wall	1	106½	3½	12	1405		
-do-	1	34		5-12			
-do-	1	29		5-12	264		

DISTRICT.

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Power House Building continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
11. Chir wood work.	Brought forward						
Door frames	1	24	1/3	5/12	3.33		
Window	13	22	1/4	1/3	23.83		
C.S. Window	21	12	1/4	1/3	21.00	48.16	cft.
12. Chirwood door leaves.						500/4	
Sliding door leaves &c.							
13. Chirwood door leaves.							
Window & C.S. window galvanized full.							
Window	13	4		5 1/4	286		
C.S. -do-	21	3 1/2		2 1/4	197		
door	1	5		3 1/4	42	525	sft
14. Stone paving	1	250	6	1/4	750	cft	
15. 22 Br g Iron sheeting including labour of fixing.							
Roof	2	87		16 1/2	2914	sft	
---- roof	1	15		16	240	3154	
16. Ridge	1	87		2 1/4	218	sft.	
17. Lead sheeting at junction of trusses.							
Gallery wall	1	36		2	72	sft	
Painting & varnishing							
door	2x2	8		11	352		
-do-	1x2	5		6 1/4	35		
Window	13x2	4		5 1/4	572		
C.S. Window	21x2	3 1/2		2 1/4	394	1403	sft
18. Painting iron in excess.							
20. Earth filling			L.S.				
Main room	1	78 1/2	22	1	1733		
Switch room	1	30	12	2 1/4	200	2533	cft.
21. Scaffolding							
Back to main room	2	150		6	1800		
front room							
-do-	2	23		6	312	2112	sft
22. Site clearance			L.S.		90/-		
N.P.							

Page 2 of 2

DETAIL OF MEASUREMENTS, ETC. —(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, parns. 1173 and 1179.)

[illegible]

Revised Estimate of Tail Race.
Naini Tal Hydro-Electric Scheme.

56

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
<u>1. Excavation.</u>					
Inner side of Power House	1	72	7½	5	2700
Outer side "	1	17	7½	5	638
-do- -do-	1	4	7½	6	180
-do- -do-	1	8	7½+13 2	7	574
-do- -do-	1	24	13	7	2184
-do- -do-	1	10	3	9	270
End round portion	1	11	3	4	132
Wings	2	2	3	9	108
For end pitching	1	12+15 2	11	1	149
Recorder house founds	1	13	3½	4	182
-do-	2	7	3½	4	196
For chamber	1	5½	3½	7	<u>135</u> 7448cft.
<u>2. Hill Cutting.</u>					
at the end of tail race	1	20	20	2½	10000cft.
<u>3. Cement concrete.</u>					
Inner side of power house	1	72	7½	1	540.00
Outer -do- -do-	1	17	7½	1	127.80
-do- -do- -do-	1	4	7½	1	30.00
-do- -do- -do-	1	8	7½+13 2	1	82.00
-do- -do- -do-	1	24	13	1	312.00
-do- -do- -do-	1	10	13	1	130.00
-do- -do- -do-	2	2	3	1	12.00
-do- round portion	1	11	3	1	33.00
For chamber	1	5½	3½	1	19.25
in floor	1	8	8	½	<u>32.00</u> 1317.
					Say 1318 cft.

N.P.

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
4. Cement masonry upto G.L.					
Inner side of power house	2	72	2	3½	1008
Outer of -do-	2	17	2	3½	238
-do-	2	4	2	5½	88
-do-	2	8	2	6	192
-do-	2	24	2	6	576
-do-	2	5	2	8	160
-do- wings	2	24	3½	8	170
3' top of end wall round	1	11	11½	3	50
Chamber	1	5	2	5½	57
-do-	2	2	2	5½	46 25150ft.
5. Lime masonry.					
End round portion below 3'	1	11	11½	6	132
1½" thick wall both side of tail	2	39	1½	2½	263
-do- parapet. race long.	2	39	1½	½	59
Found of recorder house	1	13	3½	1	46
-do-	1	12½	3	1	38
-do-	1	12	2½	1	30
-do-	1	11½	2	2	46
Side walls	2	7	3½	1	49
-do-	2	7½	3	1	44
-do-	2	7½	2½	1	38
-do-	2	8	2	2	64
Superstructure recorder house.					
Long walls	2	11	1½	7½	253
on C. Walls	2	8	1½	7½	184 1246
Deduct. Door	1	3	1½	6	27
Window	2	3	1½	3½	32
Cement masonry wall	1	11	1½	½	8
-do-	1	11	1½	2½	37 104 1142 015
N.P.					

[illegible]

Naini Tal Hydro-Electric Scheme
Tail Race. Contd.

58

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
6. <u>R.C. Work including Iron work.</u>					
Inner side of Power House	1	72	4½	½	81.00
-do- outer	1	17	4½	½	19.13
-do-	1	4	4½	½	4.50
Notch	1	4½ 12	25 12	½	2.92
Slab over roofs	1	12½	12½	4/12	52.08
Lintel over door	1	4½	1½	½	3.38
-do- window	2	4½	1½	½	6.75
					169.76 Say 170 cft.
7. <u>Boulder Pitching below the fall.</u>					
	1	8	8	½	32
	1	14	7	1	98
					130 cft.
8. <u>Earth filling.</u>					
Outer side of Power House.	1	17	7½	½	64
-do-	1	72	7½	½	270
-do-	1	4	7½	½	15
Recorder House	1	8	8	½	32
					381 cft.
9. <u>A. Sall wood Planking</u>					
	3	8½	5	4/12	42.50
	1	8½	2½	4/12	7.08
					49.58 cft.
<u>B. Chirwood doors frame</u>					
Doors 3 x 6½	1	18	5/4	4/12	7.50
Windows 3 x 3½	2	13	4/12	3/12	2.67
					10.17 cft.
10. <u>Cement plaster.</u>					
Inner side of tails race.	2	72		3½	504
-do-	2	17		3½	119
-do-	2	4		5½	44
-do-	2	8		6	96
-do-	2	24		6	288
-do-	2	8		8	80
-do-	2	2½		8	40
Top of end R. Wall	1	11	11/2		60.5
Chamber	1	6		5½	37.5
Parpit of wall 14" thick	2	39		1½	117
					1386.5 cft.
N.P.					

[illegible]

Tail Race contd.

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
11. <u>Lime pointing.</u>					
1½' thick walls outer & inner sides.	2x2	39		2½	351
On the plinth	1	34		1	34
-do- All round of building	1	24		7½ 12	184
-do- all -do-	1	11		28 12	29
<u>educt.</u>					599
Doors	1	3		6	18
Windows	2	3		3½	21
					599 Sft.
12. <u>Lime plaster.</u>					
Inner side of recorder house.	1	32		7½ 12	245 Sft.
13. White washing as No. 12					245 Sft.
14. <u>Iron work.</u>					
Hold fast for door 2'x2"x½" 3x2x2				170 lbs	20.40
-do- Window 1½"x1½"x½" 2x2x½				1.28	2.56
					22.96
Miscellaneous Iron work		L. S.		20 lbs	20.00
					42.96 Say 43
15. 1½" Chirwood work.					
Windows	2	3		34	21
Door	1	3		6	18
					39
16. Site clearance	1	Job		30/-	Rs. 30/-

N.P.

[illegible]

DISTRICT.

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work, } Revised Estimate of Staff Quarters.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, pages 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Brought forward					...		
1. Excavation of foundations.							
Long walls	2	73½	3½	4	1917		
End & cross wall	7	6½	3½	4	591		
Verandah long wall	1	73½	2½	4	737		
-do- End walls	2	4½	2½	4	95	3340	
Excavation of retaining wall.							
	1	85	6+6½ ¹⁰ 12	4½+2½		1318	4658 cft
			3	2			
2. Rubble stone masonry in lime mortar, upto to plinth.							
Main long walls	2	73½	3½	2	959		
-do-	2	73½	2½	1	403		
-do-	2	72½	2½	2	655		
End & cross walls	7	6½	3½	2	296		
-do-	7	7	2½	1	135		
-do-	7	7½	2½	2	236		
Front verandah	1	73½	2½	2	369		
-do-	1	73½	2	1	146		
-do-	1	72½	1½	2	218		
Verandah end walls	2	4½	2½	2	47		
-do-	2	5½	2	1	21		
-do-	2	5½	1½	2	54	3519 cft.	
					3519		

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
(2) Rubble stone masonry in lime mortar upto plinth level			B.F		3519
Jambs of doors in 14" wall in 1st Storey	6x2	1 1/2	1 1/2	6 1/2	205
-do- windows -do-	6x2	1 1/2	1 1/2	3 1/2	110
-do- almirah -do-	12x2	1 1/2	1 1/2	4	252
Backs of -do- -do-	12	1	2	4	96
Jambs of doors in 18" walls 2nd Storey	6x2	1 1/2	1 1/2	6 1/2	176
-do- windows -do-	6x2	1 1/2	1 1/2	3 1/2	95
-do- almirah -do-	12x2	1 1/2	1 1/2	4	216
Backs of -do- -do-	12	1	2	4	72
1' top of long wall	2	74 1/2	1 1/2	1	217
-do- gables	1x2	4 1/2	1 1/2	1	95
Stairs under plinths	1	17 1/2	2	2	70
Large portion in height	1	7	2	9 1/2	130
-do-	1	9 5/12	2 1/2 + 2		87
Retaining wall under G.L.	1	85	6 + 6 10/12	4 1/2 + 2 1/2	1318
-do- above of G. L.	1	85	3		
-do- above of G. L.	1	85	11 1/2 + 13 1/2 x 2	6 10/12	4740
			2	2	11498 cft
Deduct.					
Stair opening lintel of R.G.	1	5 1/2	2	1	8
-do- -do-	1	4 1/2	2	1	5
Stair opening	1	4	2	6 1/2	52
-do-	1	3	2	3	18
					83
					11415 cft.
3. Rubble stone masonry in clay.					
Superstructure.					
Long walls 1st story	2	72 1/2	1 1/2	8 1/2	2149
Cross wall -do-	7	8	1 1/2	8 1/2	833
Long wall 2nd story	2	72 1/2	1 1/2	12	2601
Cross walls -do-	7	8 1/2	1 1/2	12 + 13 1/2	1142
				2	6725
A.P.					

[illegible]

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
3. Rubble stone masonry in clay.		B.	F.		6725.
Deduction.					
Doors opening	6	3½	1½	6½	239
-do-	6	3½	1½	6½	206
Windows -do-	6	2½	1½	3½	92
-do- -do-	6	2½	1½	3½	79
Almirah -do-	12	2x2	½	4	144
Lime masonry the same as Item No. A in Sub-Head No. II					1634.
R.C. Lintel Over doors	6	5	1½	½	26
-do- -do-	6	5	1½	½	23
-do- Windows	6	4	1½	½	21
-do- -do-	6	4	1½	½	18
-do- Shelves	12	2x3½	½	½	47
					2528 4197 0.
4. Rewarie Patent Slates.					
Stairs	11	2	0	1	22
-do-	1	2	7		14 36 sft
5. R.C. Work including iron					
The same as item No. 6 In Sub-Head No. II Item No. B.C.					13
in sub-head No. 3 -do- B					135
Shelves planking	24	2	½	1/8	4.50
Padastals	15	1	1	½	11.25 163.750ft
6. Chir wood work.					
Doors frames (3½x6½)	12	20	5/12	4/12	33.33
Windows frames (2½x3½)	12	12	4/12	3/12	12.00
Wall plates	4	75½	3/12	4/12	25.08
Main rooms Karries	6x6	9	4/12	½	54.00
Lower verandah posts	15	8½	½	½	31.88
Bressummer over -do-	1	72½	½	½	16.06
Karries over verandah	35	8	4/12	½	46.67
summer under above posts	1	72½	3/12	3/8	6.77

[illegible]

Staff Quarters Continued.

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
		B.	F.		
Above posts	15	7	3/8	3/6	14.77
Bressumers	1	75 1/2	1/2	3/8	14.11
Lower side Bressumer	2	8	1/2	1/2	4.00
Above Bressumer	2	8	3/8	1/2	3.00
Rafters front	25	15	4/12	3/12	31.25
-do- Back	25	8	4/12	3/12	16.67
Ridge	1	75 1/2	3/12	4/12	6.30 317.89cft.
7. Chir wood planking 1 1/2" thick for verandah.					
Main room	6	8	10	"	480.00
Verandah	1	72 1/2	7	"	505.75 985.75 sft.
8. 3/4" Planking of Chir wood for					
front side.	1	75 1/2	15	-	1128.75
Back	1	75 1/2	8	-	602.00 1730.75 sft.
9. Lime pointing.					
front & back sides	2	72 1/2		19	2476
Side gables wall	2	13 1/2	22 1/2	19	554
Stair faces	12	2	10/12	10/12	20
-do- side	1	9		9 1/2	83
-do-	1	17 7/12	9 1/2		81
Retaining walls	1	90	2	x	10 900 3114.
Door	12	3 1/2		6 1/2	273
Windows	12	2 1/2		3 1/2	105 378 2736 sft.
10. Lime plaster.					
Lower rooms all round	6	36		9	1944
Upper long walls sides	6	2x10 3/8		11	1370
-do- Gable Sides	6	x 2 x 8 1/2		11 1/2	1224 4534 sft.
11. Coal-tarring					
	1	Job		15/-	
12. Site clearance					
	1	Job		60/-	
13. White washing, the same as lime plaster in sub-head No. 10. 4534 sft.					
14. Panelled door leave 1 1/2" thick					
Doors	12	2 1/2	5 1/2		177.92
Windows	12	2 1/2	3 1/2		77.08 255.09cft.
N.P.					

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
15. <u>Earth filling.</u>					
Main room	6	9½	7½	1	428
Above	6	10	8	½	120
Verandah Lower	1	69½	6	5/8	<u>262</u> 810 cft
16. <u>Lime concrete.</u>					
In verandah floor above	2	69½	6	3/8	314 cft
17. <u>Iron sheeting in roof including labour of fixing.</u>					
Front sides	1	75½	15		1129
Back	1	75½	9		<u>677</u> 1306 sft.
18. Ridge	1	75½	2		151 kft.
19. <u>Iron work.</u>					
Bars of padastals 5/8"	15	2½	1.04		79.00
Washer ½" x ½"	15	1/2	5.10		38.25
Straps ½" x 1½"	13	3½	1.23		58.24
Bolts ½" x ½"	13	½	1.668		6.56
Bars of wall plates both sides	15x2x	1.50			45.00
Washers ½" x ½"	15x½	5.10			38.25
Flat iron 1½" x ½"	4x 1 x	1.28			5.12
Bolts for rafters	2x ½" 25x2x	668			33.40
Washers ½"x½"	25	½	5.10		63.75
Miscellaneous iron work		L.	S.		<u>20.00</u> 347.52lbs
					348lbs 4.31 mds
20. <u>Painting & workmanship</u>		L.	S.		100/-
21. <u>Saucers drain</u>	1	130	5	-	650/-
-do-	1	75	3		<u>225</u> 875sft.
22. <u>Hill cutting of R. Works</u>	2 1	86	9	<u>2x6</u>	3060
-do- -do-	2	20	3	<u>3x9</u>	840
Levelling site after M.B. page	20				<u>14719</u> 186190cft

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Superintendents quarter.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or c.p.h.			
	Brought forward				...		
1. Excavation of foundations.							
Main long wall	2	49½	3	4	1188		
-do- end & C. Wall.	4	12½	3	4	600		
Front & Verandah long	1	45½	2	4	364		
-do- End & C. Wall	2	9½	2½	4	183		
Bath room long wall	2	11½	2½	4	222		
Back verandah	1	27	2	4	216		
-do- End & C. Wall.	4	6½	2½	4	265	30380ft.	
2. Stone masonry in lime mortar upto plinth.							
Main long wall	2	49½	3	2½	742		
-do-	2	49	2½	1½	367		
-do-	2	48½	2	1½	291		
End & Cross wall	4	12½	3	2½	375		
-do-	4	13½	2	1½	162		
-do-	4	13	2½	1½	195		
Front verandah	1	45½	2	2½	227		
-do- long wall	1	45½	1½	1½	119		
-do-	1	45½	1½	1½	85		
-do- end wall	2	9½	2½	2½	114		
-do-	2	9½	2½	1½	62		
-do-	2	9½	2½	1½	49	2786	
	Carried over				...	2786	

Naini Tal Hydro-Electric Scheme.
Superintendent's Quarter continued.

27 67

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
(2) Rubble stone masonry in lime.					
Upto Plinth.		B.s	F.		3657
Jambs of doors ($4\frac{1}{2} \times 7\frac{1}{2}$)	6	$2 \times 1\frac{1}{2}$	$1\frac{1}{2}$	$7\frac{1}{2}$	270
-do- windows (3×4)	6	$2 \times 1\frac{1}{2}$	$1\frac{1}{2}$	4	108
-do- doors ($3\frac{1}{2} \times 7$)	2	$2 \times 1\frac{1}{2}$	$1\frac{1}{2}$	7	63
-do- windows (3×4) in 15" wall	2	$2 \times 2 \times 1\frac{1}{2}$	$1\frac{1}{2}$	4	30
-do- doors ($3 \times 6\frac{1}{2}$)	2	$2 \times 1\frac{1}{2}$	$1\frac{1}{2}$	$6\frac{1}{2}$	49
End walls of front verandah	2	9	$1\frac{1}{2}$	$6\frac{1}{2}$	150
1' top of wall long	2	48	$1\frac{1}{2}$	1	144
-do- Gables	4	$2 \times 7\frac{1}{2}$	$\frac{1}{2}$	1	90
-do- 15" front wall	2	10	$1\frac{1}{2}$	1	26
-do- End walls.	4	9	$1\frac{1}{2}$	1	45
Pillar of chimney	2	$2 \times 2 \times 1$	$1\frac{1}{2}$	$12\frac{1}{2}$	56
Chimney over roof	21	$3\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{1}{2}$	266
-do- -do-	21	$3\frac{1}{2}$	2	$\frac{1}{2}$	68
-do- -do-	1	$2\frac{1}{2}$	2	2	11
-do- Top-	1	$3\frac{1}{2}$	2	$\frac{1}{2}$	5

5038

Deduct.

Opening of end walls of verandah

-do- -do- lintels

-do- of chimney

1 5 $1\frac{1}{2}$ 7

2 $6\frac{1}{2}$ $1\frac{1}{2}$ $\frac{1}{2}$

2x 2 x $2\frac{1}{2}$ $1\frac{1}{2}$

44

12

11

67

4971 cft.

3. Cement masonry.

Over top of chimney

1 $3\frac{1}{2} \times 1\frac{1}{2}$ $2\frac{1}{2} \times 1\frac{1}{2}$ 2

3.28 cft.

4. Clay masonry.

Superstructure.

Main long walls.

3 48 $1\frac{1}{2}$ 12

1728

Cross walls.

4 14 $\frac{15-12}{2}$ $1\frac{1}{2}$

1197

Cross & end walls 15" thick

4 9 $1\frac{1}{2}$ $6\frac{1}{2}$

301

-do- -do-

2 8 $1\frac{1}{2}$ $6\frac{1}{2}$

130

3456

N.P.

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
4. Clay masonry contc.		B.	F.		5356
<u>Deduction.</u>					
Opening of verandah	2	5	1½	7	88
-do- doors(4½x7½)	8	1½	4½	7½	405
-do- windows(3x4)	6	3	1½	4	108
-do- doors 3½x7	2	3½	1½	7	74
-do- windows 3x4 in 15" wall	2	3	1½	4	30
-do- door 3x6½	2	3	1½	6½	49
Item No. A & B in Sub-Head No. 2					A 520 B 350
Items No. C. in subhead No. 5					106 1730 1636cft.
5. <u>B.C.Work including iron work.</u>					
Lintel overdoor (4½x7½)	8	6	1½	¾	54.00
-do- window (3x4)	6	4½	1½	¾	30.38
-do- doors (3½x7)	2	5	1½	¾	11.28
-do- windows(3x4) 15" wall	2	4½	1½	¾	6.63
-do- doors (3x6½) 15" wall	2	4½	1½	5/12	4.69
Padastals	16	½	¾	¾	6.75
					112.70 cft.
6. <u>Lime plaster inner side.</u>					
Main room long walls	6	14	-	12½	1950
-do- Gable walls	6	14	-	16½ 12½	1197
Pantry and both rooms	2	8	-	11½	184
-do-	2	8	-	7½	120
-do-	4	8	-	11½ 7½	304
					2855 Sft.
7. <u>Lime pointing.</u>					
Front verandah	1	43½	-	12½	569
Faces of end walls	2	11¼	-	6½	148
Outer sides -do-	2	11½	-	7½	173
Inner faces of opening	4	1½	-	7	35
Side walls	2	35½	-	6½ 18	870
Back side of pantry	2	10½	-	6½	137
-do-	2	9½	-	11½	213
					2145
N.P.					

Superintendents quarter contd.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
7. <u>Lime pointing. contd.</u>					2145
<u>Deduct.</u>					
Openings	2	2	5	7	140
Windows	6	3		4	72
Doors	2	3		6½	39
					<u>201</u>
					1894 sft.
8. <u>Chirwood Work.</u>					
Doors frames 4½ x 7½	8	23	5/12	4/12	24.44
Window -do- 3 x 4	8	13	4/12	3/12	8.66
Doors -do- 3½ x 7	2	20	5/12	4/12	5.55
-do- -do- 3 x 6½	2	18	5/12	4/12	5.00
Wall plates	2	51	4/12	3/12	6.50
Bressumers	2	51	3/8	+	19.12
Ridge	1	51	6/12	+	15.93
Posts	16	6½	3/8	3/8	14.62
Rafters	2	18	21x3 2	5 12	78.75
Ridge	1	51	3/12	4/12	4.25
					1340ft.
					Say 135 Cft.
9. ½" Planking for roofing	2	51	-	18	1836 sft.
10. Iron sheeting for roofing including cost of fixing.	2	51	-18	18	1836 sft.
11. Ridge	1	51		2	102 sft.
12. <u>Panelled and glazed doors & windows.</u>					
Panelled doors	2	4½		7½	67.50
-do- windows	2	3½		7	49.00
1/3 Glazed doors	2	3		6½	39.00
2/3 -do- -do-	6	4½		7½	202.50
Full glazed windows	3	3		4	96.00
					<u>2723ft</u>
13. <u>Cement concrete filling.</u>					
Verandah floor	1	46½	3	1/8	43.50
-do- Back	1	37	3	1/8	27.00
Main rooms	3	13½	13½	1/8	68.34
Back rooms	2	7½	7½	1/8	14.06
					<u>152.9</u>
					1560ft.
N.P.					

Maini Tal Hydro-Electric Scheme.
Superintendents quarter contd.

70.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
14. <u>Line concrete filling.</u>					
Front verandah	1	46½	8	3/8	140
Ido- Back	1	27	8	3/8	81
Main rooms	3	13½	13½	3/8	205
Back rooms	2	7½	7½	3/8	42 468 cft.
15. <u>Earth filling.</u>					
Verandah	1	46½	8	1	372
Back	2	27	8	1	216
Main room	1	13½	13½	1	547
Back room	2	7½	7½	1	113 1246 Cft.
16. <u>Iron work.</u>					
½ x ¼ Washers in pillars	16 x ½ x	5.10 lbs			40.80
½" H. Bars for wall plates	16 x 2	.668 lbs.			24.04
½ x ½" Washers "	18 x ½	5.10 lbs			40.90
1½ x ¼" Straps	16 x 5½	1.28 lbs			69.12
½" Bolts + Long	16 x ½ x	.668 lbs			5.34
Miscellaneous iron work					30.00 215.20
					2 Mds. 11 seers.
17. Site clearance 1 Job		L.	S.		Rs. 30/-
18. Painting & varnishing		L.	S.		Rs. 60/-
19. Coaltering		L.	S.		Rs. 15/-
20. <u>Saucer drain.</u>					
Front	1	52	3		246
Back	1	52	6		260
Sides	2	40	5		400 936 cft.
21. White washing same as line plaster					2835 cft.

R.P.

[illegible]

(E)

ESTIMATE No. _____

Sub-work.

Revised Estimate of Sweepers Hut.

(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, pages 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or c. p. h.			
Brought forward ...							
1. <u>Excavation of founds.</u>							
Back long wall	1	14	3	2½	105		
-do- sides	2	10½	2½	2½	141		
Front wall	1	13½	2½	1½	45		
Cross wall	1	8½	2½	2½	58		
Pardah wall	2	5	2½	1½	34		
Founds of retaining wall	1	26	2+3½ 2	3	137	520 cft	
2. <u>Hill cutting.</u>							
-do-	1	117	62 3	5/2	1511		
For Retaining wall	1	26	5+6½ 2	3	449		
3. <u>Rubble stone masonry in lime mortar.</u>							
Long wall	1	14	3	1	42		
-do-	1	13½	2½	1	34		
-do-	1	13	2	1½	39		
Side walls	2	10½	2½	1	56		
-do-	2	10½	2½	1	46		
-do-	2	10½	1½	1½	54		
Front pardah wall	1	13½	2½	1	30		
-do-	1	13	1½	1½	34		
Side pardah wall	2	5	2½	1	22		
-do-	2	5½	1½	1½	29		
C. Wall	1	8½	2½	4	25		
-do-	1	9	2½	1	20		
-do-	1	9½	1½	1½	25	454	
Grand over ...							

Revised estimate of sweepers Hut contd.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
3. <u>Lime masonry upto plinth level.</u>		B	F.		454
Superstructure					
Back long wall joints of windows.	2	1½	1½	3	14
Door	2x2	1½	1½	6½	49
Almirah	2x2	1½	1½	4	30
Back of -do-	2	4	2	3	12
1' top of wall back	1	12½	1½	1	19
-do- cross wall	1	12½	1½	1	16
-do- Side gables	2	10½	1½	1	26
Parapet open yard	2	6	1½	½	6
-do-	2	6	13¼+5¼	2	15
-do- front wall	1	12½	1½	½	5
-do-	1	12½	1½x½	2	8
Retaining wall	1	26	6½+5	2+3	374 1027 CH
			2	2	
4. <u>Clay masonry.</u>					
<u>Superstructure.</u>					
Back long wall	1	12½	1½	13	244
-do- C. Wall	1	12½	1½	8½	125
Front wall	1	12½	1½	5½	86
Open yard side wall	2	6	1½	5½	83
Main room side wall.	2	9	1½	13+8	236 774
			2	2	
<u>Deduction.</u>					
Door	1	3½	6½	1½	28
-do-	1	5½	3½	1½	24
Windows	1	2	3	1½	9
Opening of almirah	2	2	4	½	12
Lintel over door	1	3½	½	1½	8
-do- Almirah	2	7/2	½	½	5
Door lintels	2	5	1½	½	6
Lime masonry as per item No. 3 in sub-head No. 3					1100 211
					525 CH

Sweepers Hut contd.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
5. <u>Chir wood work.</u>					
Door frames	2	20	5/12	4/12	5.55
Windows	1	10	4/12	4/12	1.11
Rafters	8	13½	5/12	.21	9.45
-do-	8	2½	5/12	.21	1.75
Wall plates	2	15½	5/12	3/12	3.23
Ridge	1	15½	4/12	.21	1.09
					22.19 Cft.
6. ¾" Planking for roofing	1	16	15		240
7. Ridging	1	16	2		32
8. Iron sheeting labour of fixing	1	16	15		240

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Sweepers Hut Continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or c. p. h.			
Brought forward ...							
9. <u>Lime pointing.</u>							
Plinth all round	1	63	1	1	63		
Back side	1	13½		13	162		
Side gable wall	2	11½		$\frac{13-4\frac{1}{2}}{2}$	241		
Side face outer	2	4½		5½	80		
Outer front face	1	12½		5½	121		
Front inner side	1	10		7½	75		
Retaining wall	1	26		$\frac{6\frac{1}{2}-5}{2}$	141	960	
<u>Deduction.</u>							
Door	3	7/2		13/2	68		
Window	1	2		4	8	76	8848 ft.
10. <u>Lime plaster.</u>							
Back side wall	1	10		13	130		
Cross walls	1	10		8½	83		
Side walls	2	9		$\frac{13-8\frac{1}{2}}{2}$	191	Sft.	
					402		
11. <u>Earth filling.</u>							
Main room	1	9	10	1	90		
Under paving of yard	1	6	10	½	30	120	cft.
12. <u>Stone paving.</u>							
Open yard	1	6	10	½	30		
Carried over							

(E)
DISTRICT,

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Sweepers Hut continued.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions,				Number, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
13. Site clearance.	1 Job	L.	S.			50/-	
14. White washing the same as lime plaster in sub head No. 10					404		
15. 1½" Panelled door leaves.							
Doors	2	3½		6½	46		
Windows	1	2		4	8	54	
16. R.C.Work including iron work.							
The same as item No. B. in sub head No. 4					12		
Shelves planks	2x3 x 2 x ¼ x 1/8				1.13	13.13 cft	
17. Iron work.							
Bolts of wall plates ¾" 4x2 x .668					5.34		
Washers ½ x ¾"	4x½x	5.10			10.20	15.54 lbs.	
18. Coal taring		L.	S.			10/-	
19. Painting & varnishing		L.	S.			25/-	
N.P.							

Page _____

DETAIL OF MEASUREMENTS, ETC.---(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

(E)
DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Revised estimate of cook house in connection with
(for composite work). } power house Superintendents quarter.
(See Public Works Code, Vol. I, Chapter, XI, parts 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
				Brought forward	...		
1. <u>Excavation of founds.</u>							
Long walls	2	14½	3	2½	218		
End walls	2	8½	3	2½	128		
Founds of chimney	2	3½	1½	½	6	352 cft.	
2. <u>Rubble stone masonry in lime under plinth.</u>							
Long walls 1st layer	2	14½	3	1	87		
-do- 2nd layer	2	14	2½	1	70		
-do- 3rd layer	2	13½	2	1½	81		
End wall 1st layer	2	8½	3	1	51		
-do- 2nd layer	2	9	2½	1	45		
-do- 3rd layer	2	9½	2	1½	57		
Chimney founds	2	3½	1½	1½	17		
<u>Superstructure.</u>							
Jambs of doors	2	1½	1½	6½	29		
-do- windows	2x2x	1½	1½	3½ 3	30		
1' top of front & back wall	2	13	1½	1	39		
-do- side gables	2	10½	1½	1	32	4.130 cft. 538 cft.	
3. <u>Rubble stone masonry in clay.</u>							
<u>Superstructure.</u>							
Back long wall	1	13	1½	11	215		
Front long wall	1	13	1½	7½	146		
Side end walls	2	10	1½	7½+11 2	278		
Chimney	1	6	3	4	72	711	
N.P.							

DISTRICT.

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Estimate of Cook House in connection with Power
(for composite work). }
House Sweepres Quarter.
(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				711		
3. Rubble stone masonry in clay. B. F.							
<u>Deduction.</u>							
Opening under chimney	1	3	1½	22/7	17		
Front Hooks of -do-	4	2½	½	¾	4		
Windows opening 2½x3½	2	2½	1½	3½	24		
Doors opening 3½x6½	1	3½	1½	6½	34		
Lintel over door	1	5½	1½	½	4		
-do- over windows	2	4½	1½	½	7		
Item No. A on Sub-head No. 2					130 220	4910ft.	
4. R.C. Work including iron.							
Lintel over door 3½x6½	1	5½	1½	½	4		
-do- over windows 2½x3½	2	4½	1½	½	7	110ft.	
5. Lime pointing outside.							
Back long wall	1	13		10½	137		
Front -do-	1	13		7	91		
Side end walls	2	10		7-10½ 2	175	403	
<u>Deduction.</u>							
Door 3½x6½	1	3½		6½	23		
Windows 2½x3½	2	2½		4½	21		
Lintel of door	1	5½		½	3		
-do- of windows	2	4½		½	5	52	3518ft.
N.P.							
	Carried over						

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. }
 (for composite work). } Cook House.

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
Lime plaster inside Back wall	1	10		10½	105		
front wall	1	10		7½	75		
Side walls	2	10		7½-10½	180		
Sides of chimney	2	3		4	24		
Upper side of -do-	1	0		3	18		
front side of -do-	1	6		4	24		
Inner side of -do-	1	8		3	24	450	
<u>Deduction.</u>							
Front opening of chimney	1	1½		22/7	6		
-do- of Holes	4	½		½	2		
-do- opening of windows	2	2½		3½	16		
-do- doors	1	3½		6½	23		
Lintel of door	1	5½		½	3		
-do- of windows	2	4½		½	5	55	
						395 sq.	
<u>7. Chirwood work</u>							
Door frame	1	20	5/12	3/12	2.77		
Window frame	2	11½	4/12	3/12	1.91		
Front rafters	10	14½	5/12	2½	12.58		
Back rafters	10	2½	5/12	2½	2.17		
Wall plates	2	13	4/12	3/12	2.46	21.59 cft.	
N.P.							
	Carried over				...		

PAGE —

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work } Cook House Contd.
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward						
8. Iron Work.							
Hold fasts of doors 2'x2"x $\frac{1}{4}$ "	6x2	12	1.66		19.92		
-do- -do- windows 1 $\frac{1}{2}$ 'x1 $\frac{1}{2}$ "x $\frac{1}{4}$ "	4x2x1 $\frac{1}{2}$	12 x	1.25		15.00		
Miscellaneous iron work		L.	S.		30.00	64.92 lbs.	
9. Panelled door & window door	1	3 $\frac{1}{2}$		6 $\frac{1}{2}$	23		
Windows	2	2 $\frac{1}{2}$		3 $\frac{1}{2}$	16	398ft.	
10. $\frac{1}{2}$ " Planking for roofing							
Front side	1	16	14 $\frac{1}{2}$	.	232		
Back side	1	16	2 $\frac{1}{2}$	.	40	272 Sft.	
11. B.W.% Iron sheeting for roofing.							
Front side	1	16	14 $\frac{1}{2}$		232		
Back -do-	1	16	2 $\frac{1}{2}$		40	272 Sft.	
12. Stone paving in flooring.	1	10	10	$\frac{1}{2}$	50		
Deduction.							
Masonry for foundation of chimney.	2	3 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	6	44 Cft.	
13. Earth filling in floor under paving.							
-do-	1	10	10	$\frac{1}{2}$	50		
Deduction of wall of fire place.	2	3 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	6	44 Cft.	
14. White washing as lime plaster in sub-head No. 6						395 Sft.	
15. Coal tarring to wood work	1 Item	L.	S.			5/-	
16. Site clearance	1 Job	L.	S.			5/-	
	Carried over						

Revised estimate of valve chamber at
commencement of inlet Pipe.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
1. Excavation in hard soil with Bailing out water.	Job 1	L.	S.		Rs. 500/-
2. Cement masonry.	2	11	2	18	792
Long walls	1	3	2	18	108
Deduct. Opening for pipe	1	2	2	1½	900cft. 6
					894cft.
3. Cement concrete.					
Long sides	2	11	2	1½	66
-do-	1	3	2	1½	9 75 cft.
4. Sal wood planking	2	3 ½ 1½	3/12	18	32.25 cft.
5. Iron steps	15	Nos.			15 Nos.
6. R.C.Slab including iron work	1	11	½	7	39 cft.
7. Site clearance.	1	job	Job	1	Rs. 10/-
8. Cement pointing	1	21	-	17½	367 5ft.

Revised Estimate of Inlet Chamber.

PAGE

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Brought forward ...							
(1) Excavation of Inlet Chamber in Hard Rock & Boulder.							
Towards Road	1	56	14	$\frac{14\frac{1}{2}+11}{2}$	9996		
Hard Rock under - Do	1	56	15	$\frac{0+4+6}{3}$	2800		
Do Towards Ravine.	1	52	15	$\frac{7+4+2\frac{1}{2}}{3}$	3510		
Do for washout	1	8	6	$\frac{5+1}{2}$	144		
For 20" intake pipes	1	200	10	16	32000	16450	cft
" "	1	30	5	8	1200	33200	cft
(2) P.C. Concrete of Inlet Chamber.							
Long wall towards Road	1	9	$5\frac{5}{12}$	$\frac{2+1\frac{1}{2}+0}{3}$	37		
Short wall Do-----	1	$9\frac{1}{2}$	3	$\frac{0+1\frac{1}{2}+2\frac{1}{2}}{3}$	35		
Pit towards 18" inlet	1	$13\frac{1}{2}$	$3\frac{1}{2}$	2	88		
Do-----do-----	1	9	$6\frac{1}{2}$	$\frac{3\frac{1}{2}}{3}$	185		
And towards Ravine	1	$4\frac{4}{12}$	$4\frac{1}{2}$	2	39		
Short wall towards S.V.	1	$11\frac{1}{2}$	9	$\frac{8\frac{1}{2}+7\frac{1}{2}+9}{3}$	39		
-----do-----	1	$11\frac{1}{2}$	$4\frac{8}{12}$	$\frac{1\frac{1}{2}+1\frac{1}{2}+\frac{1}{3}}{3}$	72		
-----do-----	1	$8\frac{1}{2}$	$11\frac{1}{2}$	$\frac{15\frac{1}{2}+11\frac{1}{2}+8\frac{1}{2}}{3}$	1163		
Floor of Washout.	1	$11\frac{1}{2}$	9	$\frac{1}{2}$	78		
Carried over ...					776	776	

ESTIMATE No.

Self-work.

(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

[illegible]

Nairi Dal Hydro-Electric Scheme.

Revised Estimate of Inlet Chamber, NEW No. 68, OLD 67

PAGE—

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward						
(2) P.C Concrete of Inlet Chamber (continued) B.F.					776		
Well toward Ravine	1	9	8	3½	234		
Do-----centre.	1	6	7	1½	53		
Right Centre Piece	1	7	6	¾	32		
Long wall towards Ravine	1	5½	6	1½	58		
-----Do-----	1	5	6	3½	105		
Above centre stone	1	9	6	1½	51		
Centre portion	1	8	9	¾	54		
Long wall toward road	1	10½	8	3½	307		
Do-----do-----centre	1	6	7½	3½	116		
Centre floor	1	12	5½	1½	116		
Upper opening floor	1	7	5½ x ¾		29		
Centre floor	1	12	8½	1½	53		
Above S.V. Chamber floor	1	9½	16½	1½	176		
Cement concrete plugs in trenches for pipes	1	10	5	13	650		
N. 1.	1			mean			
N. 2, 3 & 4.	3	7	7	4	568		3328 cft
Carried over							

DISTRICT.

ESTIMATE No. _____

Self-work.

(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

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PAGE—

DETAIL OF MEASUREMENTS, &c.—(continued).

Toilet chamber continued.

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter XI, paras. 1178 and 1179).

Serial No. and name of sub-head and details of work.	Dimensions.				Numbers, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
3. Rubble stone cement masonry. Brought forward							
Lower piece towards O.V.C. 1	1	11	5½	8/12	39		
do above	1	15½	5½	8/12	55		
do do	1	6½	5	½	17		
Side layer towards Nela	1	15½	5	10/12	65		
L.Wall towards Ravine	1	14½	4½	10/12	68		
do do	1	5½	3½	½	10		
Above floor level upto 5th layer.							
1st layer.	1	8½	6½	1	57		
2nd layer.	1	11½	6½	3/8	280		
3rd do towards Ravine	1	14½	5½	2½	336		
Cross wall.	1	9½	6½	4½	293		
L.Wall towards road.	1	20	6½	4½	618		
do do	1	4	6½	3½	98		
Front portion.	1	9½	6½	4	172		
Side wings front above 1st layer.	2	9½	6½	4½	388		
Long wall of road side ravine.	2	23½	6½	4½	1119		
O. Wall.	1	9½	5½	1½	82		
Front portion.	1	8½	6½	1½	55		
Wings.	2	8½	5½	1½	109		
O.V. Chamber founds towards road.	1	3½	3	5½	48		
Do	1	8½	3	3½	85	3994	640.
Carried over							

(E)

DISTRICT.

PAGE _____

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter XI, paras. 1178 and 1179)

[illegible]

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
5. Cement pointing outside.					
Long round wall.	1	34	12	-	408
Pitching.	1	25	8 9/16	-	225
Outlet chamber side	1	16	5		80
do pitching	1	17	8		136
do do round portion.	1	8	5		40
do S.V. Chamber outer side	1	24	24		480
do outer side.	1	9 1/2	6		57
Retaining wall	1	13	9		117
do	1	15	5		75
do	1	15	2		30
Inner side of S.V. chamber.	1	34	9 1/2		323
Left side and right side upto top	2	38	14 1/2		1102 3393 Sft.
6. P.C. Fillet.					
Round portion.	1	8	2	1/2	8
One piece	1	3	1 1/2 x 1 1/2		0.36
Do	1	25	1 1/2 x 1 1/2		4.69
Do	6	38	1 1/2 x 1 1/2		42.75 56.00 Sft.
7. Cement plaster over fillets.					
Round portion	1	8	3 1/2		12
One piece	1	3	1 1/2 x 1 1/2		2
do	1	25	1 1/2 x 1 1/2		16
do	6	38	1 1/2		143 173 Sft.
8. R. C. Work.					
Opening of outlet chamber (3'x3')	2	4 1/2	6 1/2	1/2	29.25
do (2'x2')	2	3 1/2	6 1/2	1/2	22.75
do (2'x2')	2	3 1/2	2 1/2	1/2	9.63
Inner ring base.	1	18	9 1/2	1	171.00
Do vertical.	1	51 1/2	21	1/2	511.43
Main pillar	1	13	21	2	546.00
Horizontal beams.	12	3	1	1	36.00
Do	4	3	1	1	12.00
			C.	O.	1537.78

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
R.S. Work continued.		P.	P.		1637.73
Roofing of velocity limiting valve	15½	3	½	3/8	34.22
2" slab over wash and valve chamber	1	3½	3½	5/12	2.34 1662.62 cft
Iron Work.					
For lintel (3x3) opening ½" R.B.	2	12	4½	.108x568 lbs	72.14
do (2x2)½" R.B.	2	12	3½	8- x.568 lbs	56.11
do (2x2)½" do	2	5	2½	36 x.568 lbs	23.33
For R.S. Ring.					
5/8" Horizontal bars in long wall in base.	2	14½	1.04	lbs	30.16
" do	2	3½	1.04	lbs	7.28
" do	1	3½	1.04	lbs	3.64
" do	1	8½	1.04	lbs	8.84
" do	2	4½	1.04	lbs	9.36 110.91
" do	2	7½	1.04	"	15.60
5/8" in brackets	9x4	4½	1.04	"	168.48
do	18	4 x 4	1.04	"	299.52
" do	4	14	1.04	"	58.24
" do	12	10½	1.04	"	131.04
" do	2	12x4	1.04	"	99.84
3/8" do	2	5	3½x.376		13.16
" do	2	3	4½.376		10.16
" do	2x3	5½ x	.376		12.41
" do	2x7x4½x.	.376			33.69
5/8" in circular portion.	1x 17x	1.04 lbs.			17.68
" do	2x11x14x1.	1.04 lbs.			320.32
" do	1x12x17x1.	1.04			212.16
3/8" do floor	2 x 3½ x	.376			1.07
" do	2 x 2 x	.376			1.50
" do	2 x 2 x	.376			1.50
" do	2 x 3 x	.376			2.25
" do	2 x 4½ x	.376			3.38
" do	2 x 3 x	.376			2.25

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
Iron Work continued.					
3/8" in circular portion in floor	4	4 1/2	.376		3.38
" do	4	3	.376		2.26
" do	4	2x4 1/2	.376		12.54
3/8" do in floor corner.	4	4x2	.376		14.03
2"x2"x1/4" Angle iron.	1	52	3.13	11 1/2	165.89
3"x3"x1/4" I. Iron.	1	17	5.00		102.00
for roofing of valve chamber 3/8"					
R. Bars.	10	16	.376		60.16
do 5/8" do	24x	2 x	1.04		324.34
Over wash out valve chamber 1/4"	8	3 1/2	1.34		4.59
					239.01
					113.
					228 lbs.
10. 3" Shitwood plank for roofing of inlet chamber.	1	20	10	2/12	34 cft.
11. Steps.	58	10.			58 No.
12. 3x1 wood slippers.	3x2	3 1/2	22	4/12	155 cft.
13. Plaster clay.					
Behind masonry plugs.	4	12	2 1/2	16	1920
For coffer dam on edge of lake.					500
					2,520 cft.

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Revised Estimate of Thrust blocks, anchorages &c for Power pipe line.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
1. Excavation in soft & Hard Rock.					
Thrust blocks, Opposite power house	4	6 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	253
Near the do					
5th to 7th No.	3	6 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	190
do 8th to 9th Nos.	2	6 $\frac{1}{2}$	3 $\frac{1}{2}$	2	101
do 10th No.	1	6 $\frac{1}{2}$	4	2	54
do 11th No.	1	6 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	114
do 12th & 13th in 1st Nala.	1	18	12	9	1944
do 14th No.	1	10 $\frac{1}{2}$	7 $\frac{1}{2}$	$\frac{8+3}{2}$	409
do 15th No.	1	9	5	$\frac{7+3}{2}$	270
do 16th No.	1	8	4 $\frac{1}{2}$	2	70
do 17th No.	1	8	4 $\frac{1}{2}$	3	108
do 18th No.	1	8	4 $\frac{1}{2}$	2 $\frac{1}{2}$	90
do 19th No.	1	8	5 $\frac{1}{2}$	3	108
do 20th do.	1	8	5	4	160
do 21st No.	1	7	5	3 $\frac{1}{2}$	108 123
do 22nd No.	1	8	5	3	120
Hill cutting between both the Fallas.	1	87	8 $\frac{1}{2}$	$\frac{7+3+3}{3}$	3944
do 23rd at 1st bank of 1st Nala	1	8 $\frac{1}{2}$	5 $\frac{1}{2}$	3	140
For thrust block No. 24th in 2nd Nala.	1	12	9	$\frac{10+5}{2}$	610
do 25th do	1	12	9	$\frac{9+5}{2}$	756
do 26th do	1	13	10	$\frac{8+7}{2}$	975
do 27th do	1	12	8 $\frac{1}{2}$	$\frac{7+5}{2}$	612
do 28th do	1	11	8	$\frac{X6+5}{2}$	333
do 29th do	1	11	8	$\frac{7+5}{2}$	594
do 30, 31, 32, 33, 34th in 2nd Nala	5	11	9	8	3960
Excavation in diversion of Nala.	1	180	5	4	3240
do of thrust blocks on the slope up to toe of hill above 2nd Nala.	15	9	5	4	3240
Excavation for path way on the hill slope.	1	2000	15	8	80000
do for thrust block on the slope of gangapur garden.	20	8	5	3	2400
do	15	9	4	3	2430
					<u>107540</u>

Initial Hydro Electric Scheme.

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DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
Brought forward.					107340
Excavation for fixing the pipe near Gangpur Hut.	1	240	10	15	36000
do for Retaining wall under rock	1	38	3-5	5	1480
do for different thrust blocks upto Rampur Sarai.	15	2	6	4	3240
Excavation of road near Rampur Sarai	1	230	6	3	4140
do for thrust blocks near R.H. Ry goods office.	4	9	6	5	1080
do for thrust blocks near Inlet chamber in nala.	2	9	5	4	320
Excavation for anchorages.	2x20	3½	2½	5	7700
do for making two land in nala	2	20	18.5	2.5	3600
do for Retaining walls.	1	10	18	4	400
Do	1	10	6	4	240
do on the road from Rampur Sarai to the Head of Bridge Road.	1	1000	6	3	13000
do for Head of Bridge Road to lake	1	2200	6	6½	85800
					2,70,542/ Cft.

[illegible]

DETAIL OF WORK.	No	MEASUREMENTS.			Quantities.
		L.	B.	H.	
2. Cement concrete in foundation of Thrust blocks &c.					
For thrust blocks.					
under 12th & 13th No. Thrust block in 1st Male.	1	18	12	3	432x
do 14th No. do	1	19½	7½	1½	98
do 15th No. do	1	9	6	1½	68
do 24th No. in 2nd male	1	12	8½	4	432
do 25th do do	1	12	9	4	432
do 26th do	1	13	10	6	780
do 27th do	1	12	8½	4	408
do 28th do	1	11	6	4	264
do 29th do	1	11	8	4	352
do for 30, 31, 32, 33, 34, in 2nd Male	5	11	9	6	2970
for anchorages.	2x80	3½	2½	5	7700 12931 Cft.
3. Rubble stone masonry in line.					
Thrust blocks opposite power house					
1 to 4th.	4	6½	3½	6	608
do 5th & 6th do.	2	6½	3½	6	304
do 7th do	1	6½	3½	5½	139
do 8th do	1	6½	3½	4½	114
do 9th do	1	6½	4	4½	122
do 10th do	1	6½	3½	4	102
Abutment for culverts.	3x2	20	1½	3½	600
Retaining walls.	1	10	4	10	400
do	1	20	2½	10	120
do under Rock	1	20	2½	10	1710
for thrust blocks in gangway	20	8x6	5x6	10	5872
do	15	9x6	6x6	10	5290
do near R.L.Ry compound in goods office.	4	9x6	6x6	11	1552
do on slope above 2nd male	10	9x6	6x6	7½	3967
do different pillars. T.L. 3x6 to 4x6	15	9x6	6x6	8½	4492
					25402 Cft.

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
Cement Masonry.					
Opposite power house.	4	6	3½	2½	195
do 5, 6, & 7 Nos.	3	6	3½	2½	146
do 8, 9, 10th	3	6	3½	1	59
do 11th under ground level	1	6½	3½	4½	105
do above ground level	1	5½	3½	$\frac{10}{12}$	72
do 12th & 13th under G. L.	1	17	11	7	1309
do 12th above G.L.	1	$\frac{5+3\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+3\frac{1}{2}}{2}$	9	285
do 13th G. L.	1	$\frac{5\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+8\frac{1}{2}}{12}$	11	349
do 14th including G.L.	1	$\frac{9+5\frac{1}{2}}{2}$	$\frac{6+3\frac{1}{2}}{2}$	12	313
do 15th do	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6+3\frac{1}{2}}{2}$	8	259
do 16th do	1	$\frac{5\frac{1}{2}+6\frac{1}{2}}{8}$	$\frac{5\frac{1}{2}+3\frac{1}{2}}{8}$	$\frac{10}{8}$	55
do 17th do.	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	5	127
Thrust block No. 18th.	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	5	127
do 19th	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	6	152
do 20th	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	7	195
do 21st	1	$\frac{5\frac{1}{2}+6\frac{1}{2}}{8}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{8}$	6½	165-165-
do 22nd.	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	7½	200
do 23rd.	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{4\frac{1}{2}+3\frac{1}{2}}{2}$	7½	200
do 24th.	1	$\frac{9\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+3\frac{1}{2}}{2}$	15½	620
do 25th	1	$\frac{7\frac{1}{2}+6\frac{1}{2}}{8}$	$\frac{10\frac{1}{2}+5\frac{1}{2}}{8}$	16	650
do 26th	1	$\frac{10\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{7\frac{1}{2}+3\frac{1}{2}}{2}$	13	563
do 27th	1	$\frac{9\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+3\frac{1}{2}}{2}$	12	461
do 28th	1	$\frac{8\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{5\frac{1}{2}+3\frac{1}{2}}{2}$	10	338
do 29th	1	$\frac{8\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{5\frac{1}{2}+3\frac{1}{2}}{2}$	8½	287
For 30, 31, 32, 33 & 4th No.	5	$\frac{8\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+3\frac{1}{2}}{2}$	12½	2060
near Inlet chamber in wall.	5	$\frac{8\frac{1}{2}+6\frac{1}{2}}{2}$	$\frac{6\frac{1}{2}+3\frac{1}{2}}{2}$	14	2002
Under berde and thrusts.	10	17½	11½	8	7870
do	5	17½	11½	8	3935
do	5	17½	11½	8	7480.
					29,265 cts.

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
5. Cement plaster.					
Opposite power house 1st to 4th	4	6½	3½		81
do 5, 6, 7, 8, 9, 10th.	6	6½	3½		123
do 11th	1	6½	3½		20
do 12th to 34th	23	6½	3½		467
On the slope above 2nd nala.	15	6½	3½		306
in gangipur -----	20	15	35	6½x3½	711
Different Pillars upto Rampur Sarai.	16	6½	3½		305
Near R.K.Ry. Goods office.	4	6½	3½		81
Near Inlet chamber in nala.	5	6½	3½		102
Over anchorages.	2x69	2½	3½		1540
In the base of culverts.	3	20	6		360
					4094 Sft.
6. Cement pointing.					
1st For lime masonry.					
Opposite power house on Thrust blocks 1st to 4th Nos.	4	21		6	504
5th and 6th Nos.	2	21		6	252
7th No.	1	21		5½	116
8th No.	1	21		4½	96
9th No.	1	21½		4½	97
10th No.	1	21		4	84
Abutments for culverts.	3x2	20	6		720
Retaining wall.	1	10		10	100
Do	1	10		8	80
do under rock.	1	38		10	380
For thrust blocks in gangi-pur	20	22½		10	4500
do	15	24½		10	3675
Near R.K.Ry op. - end of goods office	4	24½		11	1078
On slope above 2nd nala	15	24½		7½	2756
Different Thrust blocks upto Rampur Sarai.	45	24½		6½	3124
					C. C. 17,361

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	

DETAIL OF WORK.	No.	MEASUREMENTS			Quantities.
		L.	B.	H.	
Brought forward					17,561
6. Cement pointing contd.					
for cement masonry					
opposite power house	4	18½		2½	185
for 5, 6, 7th No.	3	18½		2½	159
-do- 8, 9, 10th No.	3	18½		1	56
-do- for 11th No.	1	18		4	72
-do- 12th & 13th	2	23½		10	470
-do- 14th	1	24		12	208
-do- 15th	1	24		8	192
-do- 16th	1	20		2½	50
-do- 17th	1	23		5	115
-do- 18th & 19th	2	21		6½	231
-do- 20th	1	22		7	154
-do- 21st	1	21		6½	137
-do- 22nd & 23rd	2	21½		7½	323
-do- 24th	1	26½		15½	403
-do- 25th	1	26½		16	428
-do- 26th	1	27		13	351
-do- 27th	1	25½		12	306
-do- 28, 29th No.	2	24		9½	444
for 30, 31, 32, 33, 34th No.	5	23½		12½	1469
near Inlet chamber in mals	5	26½		14	1855 25,229314
7. Saucer drain.					
under R. Walls	3	10	2		60
near Rampur Sarai	1	30	3		153 210 cft.
8. R.C. slab for culverts including iron work.					
-do-	3	20	7	4/12	140 cft.
9. For dismantling & rebuilding 2 mals abutment.					
-do-	2	150			300
10. Bailin put water at Thrust block foundation triangle.					
-do-	1	5	1	5	25

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PAGE _____

DETAIL OF MEASUREMENTS, ETC.--(continued)

Sub-work

(for composite work).'

(See Public Works Code, Vol., I, Chapter, XI, paras. 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward ...						
1. Levelling to the site by cutting bushes &c.	Job L.	3.					Rs. 100/-
2. Excavation of foundations.							
Front wall	1	20½	4	5½	451		
2' thick wall	2	8	4½	5½	396		
Cross walls	4	10½	4½ 8	4½	895		
Back two ft. wall	2	5½	3½	4½	136		
-do- long walls	1	39½	2½	2	217		
Main long wall	1	18	4	3½	270		
-do- cross wall	3	8	3½	2⅞	224		
Side wall	2	9½	3½	2⅞	178	2817	2817 cft.
3. Lime concrete of foundations.							
Front of back wall	2	20½	4	1	164		
-do- 2' wall	2	8	4½	1	72		
Cross wall -do-	4	10½	4½	1	194		
Back 2' short wall	2	5½	4½	1	49		
-do- long wall	1	39½	2	1	79		
Main long wall	1	18	4	1	72		
-do- cross wall	3	8	3½	1	78		
Side walls	2	9½	3½	1	62		
Floor of rear room	1	15½	11½	5/8	98		
-do- Towers	2	7½	7½	3/8	42	570	570 cft.
N.P.							
	Carried over ...						

DISTRICT.

THE UNIVERSITY OF CHICAGO PRESS

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES

$$N_1^2 \dot{\theta}_1^2 + 2N_1 \dot{\theta}_1 \dot{\theta}_2 + N_2^2 \dot{\theta}_2^2$$

For composite work:

(See Public Works Code, Vol. 7, Chapter 21, pages 1178 and 1179.)

[illegible]

DISTRICT, (E)

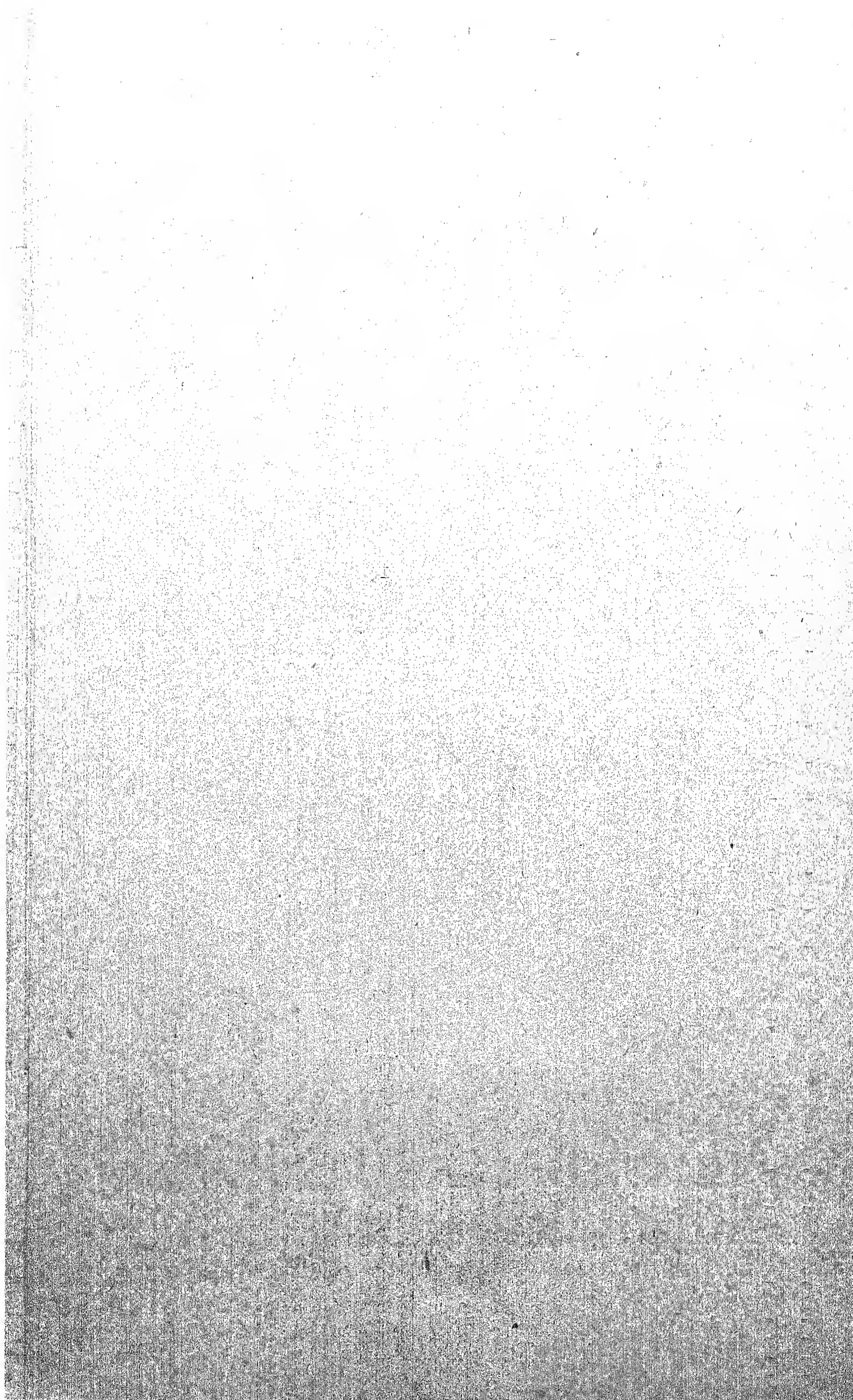
ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Sakhe Tal Sub-Station continued.
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward ...						
4. Rubble stone masonry in line up to 6 inch.							
Front wall	2	20	3½	1½	175		
-do-	2	19½	3	1½	146		
-do-	2	19	2½	1½	119		
-do-	2	16½	2	1½	130		
Cross wall	4	10	4	1½	200		
-do-	4	10½	3½	1½	184		
-do-	4	11	3	1½	165		
-do-	4	11½	2½	1½	144		
Short walls	4	6	4	1½	120		
-do-	4	3½	3½	1½	114		
-do-	4	7	3	1½	105		
-do-	4	7½	2½	1½	94		
Back long walls	1	18	2½	2½	124		
-do-	1	18	1½	2½	51		
-do-	1	18	1½	1½	39		
Cross wall	3	8½	2½	1½	86		
-do-	3	8½	2½	1½	70		
-do-	3	9	2½	1½	76		
-do-	3	9½	1½	1½	62		
Back open yard walls	2	10½	2½	3½	177		
-do-	2	10½	2½	3½	175		
-do- side	2	10½	2½	1½	68		
-do-	2	10½	2½	1½	69		
-do-	3	10½	2½	1½	60		
-do-	2	11	2½	1½	87	2240	
	Carried over ...						



Maini Tal Hydro Electric Scheme.

Estimate of Sukna Tal Sub-Station Buildings.

98

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
1. Rubble stone masonry in lime cartd. up to plinth.		B.	F.		2340
Superstructure.					
Front & Back 18" brick walls.	2	18	1½	16½	900
do do 2' do	4	10	2	21½	1733
Main cross walls.	2	12	2	21½	1040
Side walls.	2	8	2	21½	593
Chowkidars qrs. joint of doors 3½ x 3½	4x2	1½	1½	6½	98
do do windows (3x4)	3x2	1½	1½	4	30
do 3' top of main wall.	1	11½	1½	2	28
do 1' top of cross walls.	2	11½	1½	1	28
do ½' top of end walls.	2	11½	1½	½	14
do ½' top of side walls of open yard.	2	10½	1½	½	13
do 2' top rooms gable wall	2	7	1½	2	35
do parapet of open yard	2	20½	1½	½	24
Do "	2	20½	1½	1	36
			2		7512
Main rooms rendering masonry	2	21	1½	½	32
Towers do do	4	12	1½	½	36
do do do	4	13	1½	½	39
					7619 Cft.
Deduct					
Door (1x4½x7½)	1	4½	1½	7½	3167
Window (3x4)	4	3	2	4	96
main openings (6'x12')	2	6	2	12	288
R. C. Lintel over opening (6'x12')	2	8	2	12	32
do door (4½x7½)	1	6	1½	3	7
do windows (3x4)	4	4½	2	8/12	24
do top of main room	2	12	2	4/12	16
do Air ventilators	3	1	1½	½	6
do do	3	1	2	½	8
					328
					7091 Cft.
2. Rubble stone masonry in clay.					
Chowkidars quarters.					
Main long wall.	1	11½	1½	12	169

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
5. Rubble stone masonry in clay.					
Chowkidars quarters.					
Main long wall	1	11½	1½	12	169
Cross walls	2	11½	1½	$\frac{7+8}{2}$	229
End walls	2	11½	1½	7	201
Open yards side walls	2	10½	1½	7	179
Side gable walls	2	4	1½	$\frac{12+3}{2}$	172
					927 cft.
Deduct.					
Door openings (3½ x 6½)	4	3	1½	6	114
Windows -do- (3 x 4)	2	3	1½	4	30
Time masonry as item No. 1					246
in Sub-head No. 4					
R.C. Lintels of door (3½ x 6½).	4	5	1½	3	15
-do- windows (3 x 4)	2	4½	1½	2	6
					<u>409</u> 548 cft.
6. Reinforced cement concrete.					
Item No. B. in sub head no. 4					63.00
Item no. c. in sub head no. 5					19.00
Main roof	1	13½	17½	12	122.03
-do- " pieces.	4	2½	2½	$\frac{5}{12}$	10.51
Towers	2	14½	14½	.44	185.02
Beam	1	14	$\frac{9}{12}$	1	9.33
Air ventilators	16	1	$\frac{2}{12}$	3	<u>1.33</u> 410.02 cft.
7. Cement concrete.					
Floor of towers	2	7½	7½	$\frac{1}{8}$	14.06
-do- " room	2	13½	11½	$\frac{1}{8}$	58.81
Gulzarbandi of 12" wall side	1	10½	1	$\frac{3}{8}$	3.64
back (Chowkidars grs)					
Cement concrete filled in	2	5	1	1	<u>1.25</u> 57.95 cft.
joint of door of chowkidars grs					
8. Stone paving.					
Chowkidars open yard	2	11	8½	$\frac{1}{4}$	140 cft.
Line plaster.					
Chowkidars quarter main room	2	10	10	12	240
-do-	2	10	10	8	170
-do- gable wall	4	7	7	12-3	287 597 cft.

Naini Tal Hydro-Electric Scheme.
Estimate of Sakha Tal Sub-station Building contd.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
<u>10. Cement rendering.</u>					
All round of towers	2x2	13		2	104
-do-	2x2	13		2	104
Main room	2	23		2	92
Parapet of chowkidars qrs.	2	20½		4	164 464 Sft.
<u>11. Lime pointing.</u>					
Outer faces of front & back 18" wall.	2	21		15½ = 12	637
-do- -do- 2' walls	2x2	10		20½ = 12	807
Side faces outer	2	12		20½ = 12	484
Chowkidars qrs. and walls front faces	2	12½		7	179
-do- side wall outer face	1	38		7	266
-do- outer gable	1	20		5	50
-do- main end walls	2x2	11½	2	7	315
-do- sides	2	9		7	126
Main building middle room inner long sides	2	14		16½ = 12	467
-do- -do- sides	2	12		16½ = 12	400
-do- Towers	4x2	8		21½ = 12	1387 5118 sft
Saucer drain	1	55	4½		246
-do- -do-	1	82½	2½		206
-do- opening faces	4	2	12		96
<u>Deduct.</u>					5668
Openings (6 x 12)	2x2	6		12	288
Doors (4½ x 7½)	2	4½		7½	68
Doors of chowkidars shed (3½ x 6½)	2x2	3½		6½	91
Deduct the plastered wall of chowkidars shed.	2	7		12½ = 8½	144
					291 5077 sft
<u>12. Rammed earth filling.</u>					
T. room	1	13½	11½	½	78
Chowkidars rooms	2	21	6½	1	126
Towers	2	7½	7½	1	56
Open court	2	11	8½	½	91 551 sft.
<u>13. White washing the same as lime plaster in sub head No. 3</u>					697 sft.

Main Tel Hydro-Electric Scheme.
Sukha Tel Sub-station Building.

100
101

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
14. <u>Panelled & glazed doors & windows:</u>					
1 Panelled & 2 glazed door 5 (4½ x 7½)	1	4		7	28
Glazed windows (3 x 4)	4	2½		3½	35
Panelled doors (3½ x 6½) of chowkidars quarters	4	3		6	72
-do- windows (3 x 4)	2	2½		3½	18 153 sft.
15. <u>Chir wood work.</u>					
Door frames (4½ x 4½)	1	23	5 12	4 12	3.19
-do- -do- chowkidars shed. (5½ x 6½)	4	19	5 12	4 12	10.63
Windows frames (3 x 4)	6	13	4 12	3 12	6.50
Wall plates & Ridges	3	12	4 12	3 12	3.00
Rafters	7x2	12	.28	.17	7.29
Ridge batten	3	12	1 8	3 12	1.12 32.45 sft
16. <u>3" chir wood planking.</u>					
Chowkidars qrs. roofing	2	12	12	-	288 sft.
17. <u>Iron sheeting on roof including labour of fixing.</u>					
Chowkidars room	2	13½	13½		364
Ridge	1	13½	2½		34 398 sft.
18. <u>Painting & Varnishing.</u>					
doors	2	4½		7½	67
-do-	8	3½		6½	182
Windows	12	3		4	144 395 sft.
19. <u>Saucer drain masonry.</u>					
-do-	1	55	4½		248
	1	32½	2½		206 454 sft.

Neini Tal Hydro-Electric Scheme.

Sukha Tal Sub-Station Building cond.

102

DETAIL OF WORK.	No.	MEASUREMENTS			Quantities
		L.	B.	H.	
20. Iron work.					
slab over room 14' x 12'	20	17 1/2		.376Lbs	131.60
3" R. Bars					
-do- 3" -do-	17	16 1/2	1.04		287.50
-do- 3" -do-	17	16 1/2	1.04		291.72
-do- 3" -do-	17	7	1.04		123.78
-do- 3" -do-	17	7 1/2	1.04		132.60
-do- 3" -do-	3	14	1.04		43.68
-do- 3" -do-	2	14 1/2	.668		19.37
-do- 3" -do-	2	14	.376		10.53
-do- 3" -do-	14	3	.167		7.01
Beam 5" round bars	3	14 1/2	1.04		45.24
-do- 4" -do-	2	15	.167		5.01
-do- 3" -do-	2	14 1/2	.376		10.90
-do- 3" -do-	14	3 1/2	.668		32.06
Slab over 8' x 8' room 1/2 2 bars 2x11x14 10/24				.668	217.97
-do- -do- 1/2" -do- 2x14x14 1/2				.668	277.42 1636.19
-do- -do- 1/2" -do- 2x13x15 11/12				.668	266.30
-do- -do- 1/2" -do- 2x12x3x				.668	48.10
					1950.59
Lintel bars over opening 6'x12'					
3/4" R. Bars	4	8	1.5		48.00
-do- Door (4 1/2 x 7 1/2) 5/8"	3	6	1.04		18.72
Windows (3x4) in 2' wall 5/8"	4	4x4 1/2	1.04		74.88
-do- (3x4) in 1 1/2' wall 1" -do-	2	2x4 1/2	.668		12.02
Door (3 1/2 x 6 1/2) in 1 1/2' wall 5/8" -do-	4	3x5	1.04		62.40
Hold fast of doors (4 1/2 x 7 1/2)					
2"x1"	6x2		1.70		20.40
-do- windows (3 1/2 x 6 1/2) 2"x1"	4x6x2		1.70		31.60
-do- doors (3x4) 1 1/2 x 1 1/2"	6x4x1 1/2		1.28		46.08
					234.60
21. Coaltering	L.	S.	1 Job	30/-	20 Lbs.
22. Site clearance	L.	S.	1 Job	70/-	

DETAIL OF WORK.

No

MEASUREMENTS.

L.

B.

H.

Quantities.

PAGE —

DETAIL OF MEASUREMENTS, ETC.—(continued).

Sub-work
(for composite work). } Estimate of Ketchery Bagn, Sub-Station Building.
(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

Serial No. and name of sub-head and details of work,	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
<u>Excavation in founds.</u>							
Front Wall	1	20	3½	3½	245		
Cross wall	2	11	4	3½	308		
End -do-	2	13	4	3½	364		
Short -do-	4	8	4	3½	448		
Back	1	20	3½	3½	245		
Back long wall	1	19	2½	2	104		
Cross walls	3	8½	2½	2	136		
Compound wall	2	13½	2½	1½	109		
-do- side wall	2	7½	2½	1½	62	2021	Cft.
<u>2. Rubble stone masonry in lime.</u>							
upto plinth.							
Front wall	2	20	3½	1½	210		
-do-	2	19½	3	2	234		
-do-	2	19	2½	1	95		
-do-	2	18½	2	1½	111		
Side walls	2	13	4	1½	156		
-do-	2	12½	3½	2	175		
-do-	2	12	3	1	72		
Side wall	2	11½	2½	1½	86	1139	
						1139	
	Carried over				...		

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Katchery Bagh Sub-Station Building continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1173 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
2. Rubble stone masonry in lime continued including lead 23½ chains.							
upto to plinth. ...	...	....	.....	...	1139		
Cross wall	2	10	4	1½	120		
-do-	2	10½	3½	2	147		
-do-	2	11	3	1	66		
-do-	2	11½	2½	1½	86		
-do-	4	6	4	1½	144		
-do-	4	6½	3½	2	182		
-do-	4	4	3	1	84		
-do-	4	7½	2½	1½	113		
Chowkidars	1	18	2½	2	99		
-do-	1	18	2½	1	40		
-do-	1	18	1½	1½	47		
Cross walls	3	8½	2½	2	140		
-do-	3	9	2½	1	61		
-do-	3	9½	1½	1½	75		
Compound walls	2	10½	2½	1	54		
Back -do-	2	10½	1½	1½	54		
Front -do-	2	11½	2½	1	52		
-do-	1	11½	1½	1½	60		
						2757	
	Carried over				...		

MAN NEW No. 68, OLD 67.

DISTRICT.

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Kachery Bagh Sub-Station Building Continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth	Height or depth.			
	Brought forward				...		
Rubble stone Masonry in lime including lead for 25½ Chains up to plinth level.		B.	F.		2757		
Superstructure as per R. estimate of Sukhatal Sub-Station Building					4251		
					7008 cft.		
Rubble stone masonry in clay including lead of 25½ Chains the same as per R. estimate of Sukha Tal Sub-Station					548 cft.		
Reinforced cement concrete excluding iron work as per R. Estimate of Sukha Tal Sub-Station					410 cft.		
Cement concrete as per R. Estimate of Sukha Tal Sub-Station Building					58 cft.		
Stone paving. As per R. Estimate of Sukha Tal Sub-Station					140 cft.		
Lime plaster As per R. Estimate of Sukha Tal Sub-Station					697 sft.		
Cement rendering As per R. Estimate of Sukha Tal Sub-Station					464 sft.		
Lime pointing As per R. estimate of Sukha Tal Sub-Station					5077 sft.		
White washing. As per R. estimate of Sukha Tal Sub-Station					697 sft.		
Panelled & glazed doors & windows As per R. estimate of Sukha Tal Sub-Station					155 sft.		
Chirwood work. As per R. estimate of Sukha Tal Sub-Station					32.450 cu ft.		
¾" chirwood plankings As per R. estimate of Sukhatal sub-station					288 sft.		
Iron sheeting on roof including labour of fixing as per R. estimate of Sukhatal sub-station.					398 sft.		
	Carried over				...		

Sub-work
(for composite work). }

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Brought forward ...							
Carried over							

Carried over

(E)

DISTRICT.

ESTIMATE No. —

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work.

Katchery Bakh Sub-Station Building contd.

(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, para's 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
15. Painting & Vernishing As per B. estimate of Sukhtal Sub-Station					393	393 sqt.	
16. Coal-tarring					30/-		
17. Site clearance					80/-		
18. Iron work work. The same as items No. A & B in sub-head no. 19 of Sukhtal Sub-Station Building					1902.49 lbs.		
					364.10		
					2266.59 lbs		
					28.33 mds.		
19. Saucer drain masonry all round of Sub-Station	1	132	1 1/2			231 sqt	
20. Retaining wall masonry in lime.							
Long side	1	42 1/2	2	1 1/2	127		
Sides	2	8	$\frac{2+1 1/2}{2}$	1 1/2	42	169 sqt.	
21. Cement pillars for stairs.							
Right & left side	2	2	1/2	1	3		
-do-	2	2	1/2	1	1.5		
Front -do-	1	4	2 1/2	1	3		
-do-	1	4	3	1	1.5	9 sqt.	
22. Rewal slate over stairs.							
-do- 1/2" thick	2	2	2		8		
-do- 1" thick	1	4	2		8	16 sqt.	
	Carried over				...		

Sub-work

(for composite work).

(See Public Works Code, Vol., I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

Naini Tal Hydro-Electric Scheme.

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MAN NEW No. 68, OLD 67.

(E)
DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Katchery Bugh-Station Building contd.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
23. Earth filling in front of Sub-Station & all round them.							
Front 1st portion	1	30	15	1	450		
-do- 2nd portion	1	18	15	1	270		
-do- 3rd -do-	1	48	20	1 1/2	1680		
-do- 4th -do-	1	46	5	3/2	345		
Right side	1	45	21	2	1890		
Back	1	50	14	1 1/2	1050		
Side	1	32	14	2 1/2	1120		
Round earth filling as per revised estimate of Sukha tal					351		
						7156 cft.	
	Carried over				...		

Page _____

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
<u>1. Mill Cutting.</u>					
Black	1	57 $\frac{2}{12}$	12 $\frac{1}{2}$	8/4	1429
Back long wall	1	56 $\frac{8}{12}$	2 $\frac{1}{2}$	2	283
do	1	20	3	1	60
Front long wall	1	50 $\frac{4}{12}$	2 $\frac{1}{2}$	2	252
do	1	20	3	1	60
Cross walls	2	6 $\frac{1}{2}$	2 $\frac{1}{2}$	2	65
do	1	6 $\frac{1}{2}$	3	1	20
					2189 Cft.
<u>2. Lime-masonry upto plinth.</u>					
Back long wall lowest layer & front.	2	20	3	1	120
Cross wall	1	6 $\frac{1}{2}$	3	1	20
Back long wall 2nd layer.	1	56 $\frac{8}{12}$	2 $\frac{1}{2}$	1	142
Front long wall do	1	50 $\frac{4}{12}$	2 $\frac{1}{2}$	1	126
Cross walls	2	6 $\frac{1}{2}$	2 $\frac{1}{2}$	1	33
Back long wall	1	56 $\frac{8}{12}$	2	1 $\frac{1}{2}$	169
Front long wall	1	49 $\frac{4}{12}$	2	1 $\frac{1}{2}$	150
Cross walls	2	7	2	1 $\frac{1}{2}$	42
<u>Superstructure.</u>					
Long Back wall.	1	55 $\frac{8}{12}$	1 $\frac{1}{2}$	8	668
Front	1	49 $\frac{4}{12}$	1 $\frac{1}{2}$	7	518
Cross walls.	2	7 $\frac{1}{2}$	1 $\frac{1}{2}$	8+7 2	169
<u>Deduct.</u>					
Door (3x6)	3	3	1 $\frac{1}{2}$	6	81
Windows (2x6 $\frac{1}{2}$)	3	3	1 $\frac{1}{2}$	2 $\frac{1}{2}$	23
Chirwood lintel over windows	3	3 $\frac{1}{2}$	1 $\frac{1}{2}$	4/12	5
Do Door	3	4 $\frac{1}{2}$	1 $\frac{1}{2}$	4/12	7
					116
					2043 Cft.

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
3. Lime pointing.					
Back outer side	1	$68\frac{8}{12}$		8	445.
Front do	1	$49\frac{4}{12}$		7	345.
Cross walls.	2	$10\frac{1}{2}$		$\frac{8-7}{2}$	158
Inner side back long wall	1	$52\frac{8}{12}$		$7\frac{1}{2}$	408
do front	1	$45\frac{4}{12}$		$7\frac{1}{2}$	338
Cross inner side	2	$87\frac{1}{2}$		$\frac{7\frac{1}{2}-7\frac{1}{2}}{2}$	113
Plinth all round	1	126		1	<u>126</u> 1933
Deduct.					
Door	2x36			6	108
Windows.	2x32			$2\frac{1}{2}$	30 $\frac{158}{1795}$ Sft.
4. Earth filling.					
In floor	1	$52\frac{8}{12}$	$46\frac{4}{12}$	$7\frac{1}{2} \times 7\frac{1}{2}$	186 Cft.
5. $1\frac{1}{2}$ " Chairwood leave battened Door					
	3	3		6	54
Windows.	3	2		$2\frac{1}{2}$	<u>15</u> 69 Sft.
6. Chairwood work.					
Door frames (3x6)	3	21	$5/12$	$4/12$	8.75
Windows do (2x2 $\frac{1}{2}$)	3	12	$4/12$	$3/12$	3.00
Wall plate 4"x3" Back	1	$58\frac{8}{12}$	$4/12$	$3/12$	4.89
do front	1	$52\frac{4}{12}$	$4/12$	$3/12$	4.36
Kip Batten	1	14	$5/12$	$4/12$	1.94
Balters	24	$11\frac{1}{2}$	$4/12$	$3/12$	23.50
Back	24	3	$4/12$	$3/12$	3.00
Battens.	7	$58\frac{8}{12}$	$3/12$	$1/8$	12.83
Portions Baltens.	4	8	$3/12$	$1/8$	<u>1.00</u> 66.27 Cft.
7. Sheeting for roof including fixing					
Front	1	$58\frac{8}{12}$	$11\frac{1}{2}$		689.33
Back	1	$58\frac{8}{12}$	3		<u>176.00</u> 865.33 Sft.
8. Ridging	1	$58\frac{8}{12}$	$11\frac{1}{2}$		60 Hft.
9. Coal-tarring.		1	5.		Rs. 5/-
10. Iron work.		do	do		Rs. 10/-
11. Site clearance.		do	do		Rs. 15/-

Maini Tal Hydro-Electric Scheme.

Estimate of Pictorial cell.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
1. Excavation of foundations long wall	2	26	2 1/2	2	260
do do end walls.	2	6	2 1/2	2	60
Hill cutting.	1	27	10	2 3/8	2484
Cutting for drain.	1	27	8 1/2	10/2	388
do for steps	1	14 5/8	2 5/8	9/2	350
do for paving.	1	4 1/2	3	2	27
Excavation for R. walls.	4	7	2	2	112
For ventilators.	1	21	3	9	567
Drain	1	37	2	1	74
do	1	25 1/2	2	1	50 4352 Sft.
2. Lime concrete under foundations.					
Long walls.	2	26 1/2	2 1/2	1	130
End walls.	2	6	2 1/2	1	30
Floor	1	22	7	1 1/3	83
Over arch	1	2	13	1	13 256 Cft.
3. Lime masonry under plinth.					
Long walls.	2	26	2 1/2	1	130
End walls.	2	6	2 1/2	1	30
Superstructure.					
Long walls.	2	25	1 1/2	8 1/2	613
End walls.	2	7	1 1/2	8 1/2	172
Steps	14	2 1/4	1	10/12	20
do R. Walls.	4	7	2	2	112
Wall on pipe side.	1	8	2 1/2	2	40
Parapet wall.	1	30	2	2	120 1237
Deduction.					
Door (3x5)	1	3	1	5	23
Wooden lintel	1	6	1 1/2	4/12	3
Curved portion	2	7.86	1 1/2	1	24 50
4. Arch masonry.	1	25	7.86	1	196.5 197 Cft.
5. Chairwood work.					
Door frame (3x5)	1	16	4/12	3/12	1.35
Lintel over door	1	8	1 1/2	4/12	2.50 3.83 Cft.

DETAIL OF WORK.	No.	MEASUREMENTS			Quantities.
		L.	B.	H.	
6. 1" Line parallel to Eyr. Door of old house	1	47 12	24		12018.
7. Cement pointing of eider drain.	1	37	2		74
-do-	1	15	14		22 96 Sft.
8. Cement plaster on flooring	1	224	7		152
-do- over arch	1	35	13		325 4833 Sft.
9. Lime pointing in front	1	10	32 12		82
Requet 1 door	1	3	54		17 58 Sft.
10. Iron work					
Hold fasts for doors (2'x2"x4") 2x2x2					8x1.66 lbs 13.28
Hinges 6"x2"x4"	4		2x2.08		4.16
Curvey 3/8" bars 15" long	1	14 12	14 12	.363	1.10
Miscellaneous iron work		L.	S.		20.07 7.93 lbs
11. Earth filling	1	27	19	4	135
In drain after fixing pipe	1	27	24	3/2	204
Over arch	1	27	10		102 374 Sft.
12. Painting and varnishing		L.	S.		3/-
13. Site clearance 1 Job		L.	S.		20/-
14. Collateral		L.	S.		3/-
15. Sander drain	1	37	2		74/-
-do-	1	15	14		22 96 Sft.

[illegible]

Final Est. Hydro-Electric Scheme 12.
 Revised estimate of quantities used in connection with
 control cell.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
1. <u>Excavation of foundations.</u>					
Long wall	2	15	2 1/2	2	155
End walls	2	6 1/2	2 1/2	2	59
Excavation for floor	1	11 1/2	7 1/2	1/2	22 216 cft.
2. <u>Brick masonry in foundations.</u>					
Long walls 1st layer	2	15	2 1/2	2	155
End walls	2	6 1/2	2 1/2	2	59
Above foundations 1st layer 2nd	2	14 1/2	1 1/2	1/2	39
End walls layer.	2	7	1 1/2	1/2	18
<u>Superstructure.</u>					
Long wall front					108
-do- Back					136
End walls					100 703
<u>Deduction.</u>					
Door	1	6	5	1 1/2	25
Lintel over doors	1	6	5/12	1 1/2	3.36 25
					577 cft.
3. <u>Chairwood work</u>					
Door frames (3+6)	1	15	5/12	4/12	2.50
-do- side	7	1 1/2	1/12	3/12	7.09
-do- Back	7	2 1/2	4/12	3/12	1.41
Lintel over door	1	6	1 1/2	5/12	2.50
Wall plate	2	17	4/12	3/12	2.33 16.36 cft.
4. <u>1" plating for roofing back</u>	1	12 1/2	2 1/2		30
-do- side					
-do- front	1	12 1/2	17		207 237 cft.
5. <u>1" Door leave panelled</u>	1	12 1/2	17		15 13 cft.
6. <u>Iron sheeting for roofing</u>					
Back	1	12 1/2	2 1/2		30
Front	1	12 1/2	17		207 237 cft.
7. <u>Ridge</u>	1	12 1/2	2		25 25 cft.

[illegible]

Quantities shed in connection with actual call work.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	
8. Base pointing outer side					
Front wall	1	14		6 $\frac{1}{2}$	83
Back wall	1	14		10 $\frac{5}{8}$	149
Sides wall	2	10		8 $\frac{1}{2}$ 12	173
Inner side lime pointing					
Front wall	1	11 $\frac{1}{2}$		6 $\frac{1}{2}$	72
Back wall	1	11 $\frac{1}{2}$		10 $\frac{5}{8}$	122
Side wall	1	7 $\frac{1}{2}$		8 $\frac{1}{2}$ 12	65
Redaction.					
Door	2	3		6	36
					35
					6555ft.
9. Iron work.					
Hold fasts for doors, 2"x2"x $\frac{1}{2}$ " 2x2x2				3x1.65 lbs	13.28
Hinges 6"x2 $\frac{1}{2}$ "x $\frac{1}{2}$ " 4x $\frac{1}{2}$				2x2.08	4.16
Runners 3/8" R. Bar 16" long	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1.68 lbs	3.49
Miscellaneous iron work		L.	S.		20.00
					37.93
					58 lbs.
10. Earth filling in floor	1	11 $\frac{1}{2}$	7 $\frac{1}{2}$	$\frac{1}{2}$	22
					22 cft.
11. Painting and varnishing		L.	S.		Rs. 20/-
12. Coal tar		L.	S.		Rs. 5/-
13. Site clearance		L.	S.	1 Job	Rs. 10/-

M.P.

[illegible]

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.	
		L.	B.	H.		
1. <u>Earth Excavation.</u>						
Pillars under posts	12	2	2	3	144	
-do- for chowkidars room	3	2	2	1½	18	
for levelling the site	1	28	14	1	392	554 cft.
2. <u>Lime masonry for pillars of posts under G.I.</u>						
Pillars	12	2	2	3	144	
Sides wall	3	27	1	½	27	
Holes filling in old R.wall for fixing bressumar	3	2	2	2	24	195 cft.
3. <u>Lime concrete.</u>						
Above roofing	1	32	$\frac{1}{2}$	$\frac{1}{2}$	16	
Under flooring	1	29	28	½	406	422 cft.
4. <u>Drain masonry.</u>						
*. Left side	1	55	2		110	
Inner & right side	1	52	$5\frac{1}{2}$	$2\frac{3}{4}$	169	279 lft.
5. <u>Chirwood work.</u>						
Side posts	9	13	4/12	4/12	13.00	
Centre posts	4	15½	4/12	4/12	6.88	
Bressumar	2	40	4/12	5/12	11.11	
Ridge	1	40	4/12	5/12	5.55	
Rafters	16	16	4/12	3/12	21.33	
Collars	8	14	4/12	4/12	12.33	70.20
Battens	1	39	3/12	2/12		1.62
-do-	3	37½	3/12	2/12		4.69
-do-	7	35½	3/12	2/12		10.43
Caps	8	1	4/12	4/12		0.88
Outer posts of chowkidars shed	2	10	4/12	4/12		2.22
Base & top of door	2	2½	4/12	4/12		.55
Side battens	4	3	½	1/8		1.00
-do-	2	5½	½	1/8		0.51
Long sides battens	3	3	½	1/8		0.85
				Carried over.		92.95

[illegible]

Maini Tal Hydro-Electric Scheme
Lorry shed continued.

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DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.	
		L.	B.	H.		
5. <u>Shirwood work continued.</u>						
Long short sides	4	7	$\frac{1}{4}$	$\frac{1}{2}$	0.88	
Bressumer outer	1	10	$\frac{4}{12}$	$\frac{4}{12}$	1.11	
Rafters	4	10	$\frac{4}{12}$	$\frac{4}{12}$	4.44	
Battens	3	10	$\frac{1}{4}$	$\frac{2}{8}$	0.93	100.31 cft.
6. <u>Iron sheeting for roofing.</u>						
Front & back roofing	1	32	35 $\frac{1}{2}$		1144	
For chowkidars shed roof	1	11 $\frac{1}{2}$	9		104	
Front face	1	9	7 $\frac{1}{2}$		68	
Sides	2	8 $\frac{1}{2}$	$\frac{7\frac{1}{2} + 10}{2}$		147	
Inner side	1	10	7		70	
Over door	1	3	4		12	1542 cft.
7. Ridging	1	35 $\frac{1}{2}$	1 $\frac{1}{2}$		54	1ft.
8. Rammed concrete	1	29	28	$\frac{1}{2}$	406	cft.
9. Site clearance	1	Job	9		10/-	
10. <u>Cement pointing</u>						
As drain masonry in sub-head no. 4					279	sft.
11. 1 $\frac{1}{2}$ leave of door	1	6	2 $\frac{1}{2}$		15	sft.
12. Coal taring		L. S.			15/-	
13. Painting & varnishing		L. S.			30/-	
14. Iron work		L. S.			75/-	

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	H.	

Maini Tal DISTRICT.

(E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Building.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward				...		
(1) Dismantling of Roofing and wood work	1 Job	L	S.			80 /-	
(2) Two Iron Tanks cutting	1 Job	L.	S.			300 /-	
(3) Hill Cutting	1	62½	15½	$\frac{85}{2}$	19293		
	1	58	9½	14½	7989		
	1	70	30	25½	53550		
	1	$\frac{23 \times 9}{2}$	9½		983		
Slips as per M.B. No. 53 page 4.					29925		102740
(4) Excavation of Retaining wall foundations.							
Front wall	1	55	10	9	4770		
Side wall towards tank	1	8	10	9	720		
	1	14	8	6	672		
	1	$8\frac{1}{3}$	6½	4	217		
	1	7½	6½	4	195		
Side wall towards Spring house	1	21	10½	6½	1488		
	1	13	8½	6½	166		
	1	6½	6½	6½	285		
	1	$7\frac{5}{8}$	4	6½	204		
	1	10½	4	6½	269	8986	
	Carried over				...	8986	

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DETAIL OF MEASUREMENTS, ETC.---(continued)

Sub-work }
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Excavation Contd.	Brought forward						
Excavation of main Building.							
Towards of spring house.	1	36	7½	7	1390		
Retaining wall side C. Wall	1	13	9	7	819		
-do- Tank	1	36	8	7	2016		
Close to existing wall towards spring house	1	23½	5½	7	936	5661	14647 CF
(5) Cement concrete of retaining wall.							
Wall towards spring house	1	31	10½	4½	1549		
	1	3	8½	4½	115		
	1	6½	6½	4½	197		
	1	55	2	2	140	2001	
In founds of main Building.							
Towards Spring house	1	36	7+6½+8+7½	5½	1448		
Towards R. Wall	1	13 x	2+3½+2 x 5½		632		
Towards Tank.	1	36	8½+7½ x 5½		1584		
Close to existing wall towards spring.	1	2½ x	5+6+6 x 1½		201	5066 CF	
(6) Rubble stone masonry in cement mortar.							
Side wall towards pipe chamber	1	7	4	1	28		
-do-	1	19½	3½	1	63		
-do-	1	23½	3½	1	83		
						179	
	Carried over						

Naini Tal Hydro-Electric Scheme.

MAN NEW No. 68, OLD 67,

(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } pumping Station Continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Rubble stone masonry in cement mortar. Brought forward ...						179	
Long wall towards Reservoir and spring house	1	14	4	2	112		
Do	1	12	3½	1½	63		
DO	1	12½	4	4½	222		
DO	1	5	3½	1½	28		
DO	1	15	3½	1	52		
Existing wall towards Spring	1	23	3½	1½	121		
	1	32	3½	1½	140	935	915 Cft
(7) Rubble stone masonry in lime mortar. up to level							
up to ground level							
Long wall towards spring.	1	35½	3½	2½	311		
DO	1	35½	3	1½	160		
towards spring, tank	2	28	3½	1½	294		
Cross wall all round retaining wall	1	17	3½	1½	89		
do-towards pipe chamber	1	17	3½	1½	179		
Long wall towards clear water reservoir	1	35½	3½	1	124		
Do	1	35½	3	1½	160		
above G.L. long wall	2	27½	3	3/2	248		
Do	2	35½	2½	3/2	266		
Short wall	1	17½	3	3/2	79		
Do.	1	17½	2½	3/2	66		
						1976	
Carried over							

(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
		Brought forward				1976	
Rubble stone masonry in lime							
contd.							
Retaining wall	1	22	8½	9	1683		
-do-	1	8	8½	8	533		
-do-	1	7	8½	7	400		
-do-	1	7½	7½	2	112		
Side wall towards spring house.	1	32	6½	2	405		
	1	6½	5½	4	157		
-do- towards Tank.	1	11½	5½	4	264		
	1	8	8½	9	612		
	1	14	7½	6	644		
	1	8½	5½	4	189		
	1	6½	5½	4	140		
Front wall	1	46½	7½	15	3128		
Side wall towards tank and spring house.	2	13½	6½	14	1653		
-do-	2	½	6	3½	9		
Side portion towards Tank.	1	19½	3½	9	612		
Front face -do-	1	5	3½	9	158		
Wing towards tank	1	2½	2½	5	39		
Side portion towards spring house.	1	25½	3½	9	814		
Front face -do-	1	8½	3½	9	265		
Wing -do-	1	18½	3½	5	262	12079	
		Carried over				14055	

PAGE _____

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, parns. 1178 and 1179.)

[illegible]

Maini Tal Hydro-Electric Scheme. Map New No. 68, old 67,
(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } *Pumping Station Continued.*
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
	Brought forward						
<u>Rubble stone masonry in line</u> <u>Contd.</u>						23277	
Platform masonry under chlorine plant.	1	10	10	2	200		
<u>Superstructure</u>							
Drip course	1	25	2	5/8	8		
Masonry channel	2	50	2 1/2	1 1/2	375		
- do -	2	20	2	3	600		
<u>Superstructure.</u>							
One manhole	1	6	5/2	6 1/2	117		
- do -	1	6	5/2	6 1/2	59		
Long wall	2	52 1/2	2	17 1/2	2461		
	2	27	2 1/2	17 1/2	2340		
2 1/2' thick wall on -do-	2	11 1/2	2 1/2	7 1/2	422		
Cross wall	1	15	2 1/2	24 3/12	1110		
-do-	1	18	2	24 8/12	888		
2' wall over 2 1/2' wall	2	15 1/2	2	7 1/2	488		
1 1/2' -do- -do- 2' wall	2	35 1/2	1 1/2	7 1/2	781		
Upper room long wall	1	20 2/12	2 1/2	1 1/2	696		
-do-	1	20 8/12	2 1/2	1 1/2	713		
-do-	2	24	20 8/12	1 1/2	1433	12746	36023
<u>Deduction.</u>							
Sliding door (8 x 8)	1	8	2	8	128		
Door (5 x 8 1/2)	1	5	2 1/2	8 1/2	106	234	
	Carried over						

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

Maini Tal Hydro-Electric Scheme.

MAN NEW No. 63, OLD 67.

(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
 (for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Rubble stone masonry contd.	Brought forward				...		
Deduction.		B. Forward.				234	
Windows (4 x 5½) in 2½' wall	3	4	2½	5½	165		
-do- -do- 2' wall	8	4	2	5½	352		
Ventilatore in 2½' wall (3½ x 2½)	1	2½	2½	3½	23		
-do- in 2' wall -do-	3	2½	2	3½	56		
-do- -do- -do-	2	3½	2	2½	37		
-do- 18" wall -do-	8	3½	1½	2½	112		
Window of above	4	4	1½	5½	132		
<u>R.C. Work.</u>							
Lintel over sliding door	1	11	2	1½	33		
-do- under -do-	1	11	2½	½	7		
Over opening in plinth level in 2½' wall	1	7	2½	½	9		
-do- 2' wall	1	21½	2	½	22		
-do- over holes in wall	1	3	2½	½	4		
-do- -do-	1	1	2½	½	1		
-do- in 2' wall	1	2	2	½	2		
-do-	1	3	2	½	3		
						1192	
	Carried over						

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DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

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Naini Tal Hydro-Electric Scheme.

MAP NEW No. 68, OLD 67,

(E)
DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
R.C. Work including iron work contd.	Brought forward ...				840		
Slab over opening in 2' wall	1	21½	2	½	22		
" over slab	1	3	2½	½	4		
-do-	1	1	2½	½	1		
-do- slab in 2' wall	1	2	2	½	2		
-do- -do-	1	3	2	½	3		
R.C. lintel over doors	1	7	2½	1½	23		
-do- windows 2½' wall	3	5½	2½	2½	51		
R.C. lintel over windows in 2' wall	8	5½	2	1½	95		
-do- crane cornice	2	33½	2½	1	167		
-do-	2	15½	2½	1	77		
lintel over ventilator	1	3½	2½	7/12	6		
-do-	3	3½	2½	7/12	16		
-do-	8	3½	2½	7/12	44		
-do- opening	1	1½	2½	½	3		
Pad stone	9	2	1	3/2	27		
-do- or girders	1	19	33/24	22/12	48		
Lintel over windows in above story	4	5½	1½	½	16		1447
Carried over							

Sub-work

(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

Naini Tal Hydro-Electric Scheme.

Re: JAMES H. CO. and 07

INDEX

ATTACHMENT No.

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES

13-11-420000

Pumping Station Continued.

(for comparison with 1974). 9

(See Public Works Code, Vol. I, Chapter, XX, pages 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, quantity or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
Brought forward							
<u>9. Cement concrete Fillet.</u>							
Floor	1	58	18	1/8	130		
Cement fillet on round wall lower portions.	1	77½	$\frac{17}{12} + 1\frac{4}{12}$		113		
-do- width -do-	1	69½	$1\frac{1}{12} \times 1\frac{1}{4}$		98		
-do- upper portion	1	65	$\frac{1\frac{1}{2} + 1}{2}$		81		
-do- for other	1	50	9	1	450		
Under pump & motors							
under low zone pump	2	9½	$\frac{7}{12}$	3	143		
-do- Inter zone -do-	2	10½	$\frac{7}{12}$	3	163		
-do- High -do-	2	8½	7½	3	359	1537 cft.	
<u>10. Lime concrete in flooring.</u>							
-do-	1	58	18	3/8	392	392 cft.	
<u>11. Lime pointing in & out side.</u>							
Long wall	2	58	-	19½	2233		
Short walls	2	13	-	19½	693		
Transformer room long wall.	2	24	-	20	960		
-do- short walls.	2	19	-	20	760		
Outer side up to plinth	1	172	-	3/2	258		
Up to roof lower story	1	77	-	25½	1983		
	1	93	-	23½	2209		
	1	98	-	18½	1813	9275	

Naini Tal Hydro-Electric Scheme.

MAN NEW No. 68, OLD 67,

DISTRICT. (E)

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
 (for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
11. Lime painting in & out side.	Brought forward					9275	
Deduction.							
Doors.	2 x 1	8	-	11	176		
-do-	2 x 2	5	-	8½	170		
Windows	2 x 15	4	-	5½	630		
O.S. Windows	2 x 14	2½	-	3½	262	1238	8037
Retaining wall.							
* Front portion No. 1.	1	47	-	16	752		
-do- No. 2.	1	56	-	10	560		
-do- No. 3.	1	64	-	10	640		
-do- No. 4.	1	67	-	3½	234		
Top portion	1	30	-	8	240		
Flat over Kharenja of top	1	68	-	12	816		
1st. portion							
Side wall towards tank spring house.	2	15	-	16	480		
-do- side portion	2	26	-	10	520		
2nd. portion.							
Sides	2	6	-	4	48		
-do- long sides	2	6	-	9	108		
-do-	2	14	-	4½	126		
Wings towards spring	1	17	-	7	119	4653	
	Carried over						

Maini Tal Hydro-Electric Scheme PLAN NEW No. 68, old 67.
(1)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work. } Pumping Station Continued.
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
11. Lime pointing Continued.		Brought forward			4653		
Retaining wall.		B.F.			81		
3rd. Portion sides	2	9	-	4½	20		
4th Portion wing	2	4	-	2½	47		
Top portion wing towards spring.	1	5½	-	8½	57		
-do- towards tank	1	11½	-	5	806	5664	13701 sf
-do- Top Kharanje & S.	1	68	-	12			
12. Cement rendering.							
(a) Inside long walls	2	58	-	6	696	A.	
Short walls	1	18	-	6	108		
-do- -do-	1	18	-	5	90		
One projection under roof of tower.	2	36	-	2	144		
Lower story -do-	1	22	-	2	44		
-do-	1	102	-	2½	255		
Upper story							
Inside masonry channel including soffit of arch.	1	50	-	17	850		
Manhole walls	1	12	-	6½	78	2265	sf.
13. Parapet coating the same into item No. A in sub-head No. 12.					894	894	sf.
14. Chirwood Frames.							
Doors	1	24	1/3	5/12	3.33		
Windows	15	22	½	1/3	27.50		
C.L. Windows	14	14½	½	1/3	16.91	47.74	cft.
Carried over							

Page 1

DETAIL OF MEASUREMENTS, ETC.--(continued)

Sub work
(for composite work). }

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

[illegible]

(E)

DISTRICT.

ESTIMATE No. _____

DETAIL OF MEASUREMENTS AND CALCULATIONS OF QUANTITIES.

Sub-work.

(for composite work).

Pumping Station Continued.

(See Public Works Code, Vol. I, Chapter, XI, paras 1178 and 1179.)

Serial No. and name of sub-head and details of work.	Dimensions.				Number, contents or area.	Total.	Grand Total.
	Number.	Length.	Breadth.	Height or depth.			
15. <u>Doors & Windows.</u>	Brought forward ...						
(a) Sliding doors		L.	S.			250/-	
(b) Trap door		L.	S.			60/-	
(c) Door 2/3 glazed	1	5	-	8½	42		
Windows full glazed	15	4	-	5½	330		
C.L. Window	14	3½	-	2½	131		503 sft.
16. <u>Iron work.</u>							
Hold fast door 2'x2"x½"	6x2	12x 1	: 70		20.40		
-do- windows 1½"x1½"x½"	4x15x1½		90x1.28		115.20		
-do- C.L. windows -do-	4x14x1½	84 x	1.28		107.52	243.12 lbs.	
Miscellaneous iron work	Lump sum			50 lbs.		50 lbs.	
						293.12 lbs.	3.6 mds.
17. Inner strap No. 40 @		Rs. 2/-	each				
18. Manhole cover 1 No.			L.S.			55/-	
19. Pulley block			L.S.			110/-	
20. Pointing & washing	1 Job					90/-	
21. Earth filling under flooring.	1	57½	17½	1	1006		
-do-	1	18	6	2	216		
On masonry channel	1	50	3	5½	825	2047 cft.	
	Carried over ...						

PAGE ~~XXXXXXXXXXXX~~

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol. I, Chapter, XI, paras. 1178 and 1179.)

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PAGE _____

DETAIL OF MEASUREMENTS, ETC.—(continued)

Sub-work
(for composite work).

(See Public Works Code, Vol., I, Chapter, XI, parags. 1173 and 1179.)

[illegible]

Naini Tal Hydro-Electric Scheme.
Revised Estimate of Pipe Chamber II.

130.

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
1. <u>Excavation</u>					
Block.	1	31	7 $\frac{1}{2}$	9	2126 cft.
2. <u>Cement masonry.</u>					
Long wall	1	22	2$\frac{1}{2}$ 2	6 $\frac{1}{2}$	143
-do-	1	5 $\frac{1}{2}$	2$\frac{1}{2}$ 2	6 $\frac{1}{2}$	36
-do-	1	6 $\frac{1}{2}$	1 $\frac{1}{2}$	6 $\frac{1}{2}$	63
-do-	1	5	1 $\frac{1}{2}$	6 $\frac{1}{2}$	49
Pillar for support of pipes	2	2	2	2	16
-do-	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	4
-do-	1	8	1 $\frac{1}{2}$	3	36
Outer parapets	2	21 $\frac{1}{2}$	1	1	42
-do-	1	10 $\frac{1}{2}$	1	1	11
Spening manhole	2	4	$\frac{3}{4}$	$\frac{1}{2}$	3
-do-	2	3	$\frac{3}{4}$	$\frac{1}{2}$	<u>2</u> 405 cft.
3. <u>Cement concrete.</u>					
-do-	1	31	7 $\frac{1}{2}$	1 $\frac{1}{2}$	360 cft.
4. <u>R.C. Work.</u>					
Slab over pipe chamber	1	34	6 $\frac{1}{2}$	$\frac{1}{2}$	110
-do-	1	7 $\frac{1}{2}$	4 $\frac{1}{2}$	$\frac{1}{2}$	<u>16</u> 126 cft.
<u>Deduct.</u>					
Opening of manhole	1	3	3	$\frac{1}{2}$	$\frac{4}{122}$ cft.

DETAIL OF WORK.	No.	MEASUREMENTS.			Quantities.
		L.	B.	IL.	

Naini Tal Hydro-Electric Scheme.
Revised Estimate of Pipe Chamber.

131.

DETAIL OF WORK.	No.	MEASUREMENT.			Quantities.
		L.	B.	H.	
5. Lime Masonry	1	28	1½	6½	273 Cft.
6. Earth filling	1	31	7½	1	240 Cft.
7. Cement pointing	1	22		6½	143
-do-	1	5½		6½	36
-do-	1	6½		6½	42
-do-	1	5		6½	32
Pillars	2	8		2	32
-do-	1	6		2	12
-do-	1	8		3	24
-do-	1	28		6½	182
					<u>505 Sft.</u>
8. Cement plaster					
Opening of manhole	2	4		1½	12
-do-	2	3		1½	9
					<u>21 Sft.</u>
9. Lime pointing	2	21½		3	127
	1	10½		3	<u>32</u> 159 Sft.
10. Site clearance	1	Job	Rs.	12	Rs. 12/-

Sub-heads of Work in which differences occur.	Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised estimate.
Power Station Building Original ...	1	-	-	56713			
Revised ...	1	-	-	72709	15996		
-do- Equipment Original ...	2	-	-	155400			
Revised ...	2	-	-	231311	75911		
-do- pipe line Original ...	3	-	-	215025			
Revised ...	3	-	-	503151	288126		
Transmission & Distribution. Original ...	4	-	-	277761			
Revised ...	4	-	-	525000	247239		
Sub-Station Buildings Original ...	5	-	-	10842			
Revised ...	5	-	-	17177	6335		
-do- Equipment Original ...	6	-	-	66420			
Revised ...	6	-	-	97192	30772		
Temporary buildings Original ...	-	-	-	-	-		
Revised ...	7	-	-	6579	6579		
Work Establishment Original ...	-	-	-	-	-		
Revised ...	8-9	-	-	8640	8640		
New Pumping Station Original ...	1 W.S.	-	-	9000			
Revised ...	1 W.S.	-	-	63685	54685		
-do- Equipment Original ...	2-3 W.S.	-	-	131436			
Revised ...	2 W.S.	-	-	239815	108379		
Contingencies @10/- % Original ...	7, 9 W.S.	-	-	92260			
Contingencies @5/- % Revised ...	10, 3 W.S.	-	-	89902		6278	
Sanitary Engineers fee Original ...	8, 9	-	-	121782			
Revised ...	11, 12, 4-5 W.S.	-	-	222148	100366		
Compensation for time Original ...	10	-	-	3500		3500	
cutting Revised ...		-	-	741			
Total or carried over				943620	943620		

Change of design, increased rates for materials & labour.

Latest tender received cost increased owing to exchange having dropped and increased rates for labour and material.

Increase owing to exchange, and -do-

Owing to exchange, and -do-

Change of design. Increased rates for material & labour.

Note - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.

If this page does not suffice continue the explanation on a separate manuscript.
Latest tender received cost increased owing to exchange having dropped and increased rates for labour & material.

These buildings are quite essential for the interest of the work & will be handed over to Municipal Board after completion of work.

Original estimate, this item was to be met from the contingencies. Now allowed for in estimate.

Change of design. Increased rates for material & labour.

Latest tender received. Cost increased owing to exchange having dropped & increased rates for labour & material.

Saving owing to 5% allowed for in revised estimate in place of 10% in original estimate.

Excess owing to estimate being excluded in most of the sub-heads.

Over estimated in original estimate.

COMPARATIVE STATEMENT--(concluded).

NOTES.

19

Wetland Form No. 62¹

Fileto ex-10188 maced.

UNITED PROVINCES.

Neenah, Wis. DISTRICT

Second Division

Public Health Dept.

COMPARATIVE STATEMENT

And Explanation of Differences between Estimates

29 and Revised Estimate No. 1994-1995, 1995-1996, 1996-1997, 1997-1998, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025, 2025-2026, 2026-2027, 2027-2028, 2028-2029, 2029-2030, 2030-2031, 2031-2032, 2032-2033, 2033-2034, 2034-2035, 2035-2036, 2036-2037, 2037-2038, 2038-2039, 2039-2040, 2040-2041, 2041-2042, 2042-2043, 2043-2044, 2044-2045, 2045-2046, 2046-2047, 2047-2048, 2048-2049, 2049-2050, 2050-2051, 2051-2052, 2052-2053, 2053-2054, 2054-2055, 2055-2056, 2056-2057, 2057-2058, 2058-2059, 2059-2060, 2060-2061, 2061-2062, 2062-2063, 2063-2064, 2064-2065, 2065-2066, 2066-2067, 2067-2068, 2068-2069, 2069-2070, 2070-2071, 2071-2072, 2072-2073, 2073-2074, 2074-2075, 2075-2076, 2076-2077, 2077-2078, 2078-2079, 2079-2080, 2080-2081, 2081-2082, 2082-2083, 2083-2084, 2084-2085, 2085-2086, 2086-2087, 2087-2088, 2088-2089, 2089-2090, 2090-2091, 2091-2092, 2092-2093, 2093-2094, 2094-2095, 2095-2096, 2096-2097, 2097-2098, 2098-2099, 2099-2100, 2100-2101, 2101-2102, 2102-2103, 2103-2104, 2104-2105, 2105-2106, 2106-2107, 2107-2108, 2108-2109, 2109-2110, 2110-2111, 2111-2112, 2112-2113, 2113-2114, 2114-2115, 2115-2116, 2116-2117, 2117-2118, 2118-2119, 2119-2120, 2120-2121, 2121-2122, 2122-2123, 2123-2124, 2124-2125, 2125-2126, 2126-2127, 2127-2128, 2128-2129, 2129-2130, 2130-2131, 2131-2132, 2132-2133, 2133-2134, 2134-2135, 2135-2136, 2136-2137, 2137-2138, 2138-2139, 2139-2140, 2140-2141, 2141-2142, 2142-2143, 2143-2144, 2144-2145, 2145-2146, 2146-2147, 2147-2148, 2148-2149, 2149-2150, 2150-2151, 2151-2152, 2152-2153, 2153-2154, 2154-2155, 2155-2156, 2156-2157, 2157-2158, 2158-2159, 2159-2160, 2160-2161, 2161-2162, 2162-2163, 2163-2164, 2164-2165, 2165-2166, 2166-2167, 2167-2168, 2168-2169, 2169-2170, 2170-2171, 2171-2172, 2172-2173, 2173-2174, 2174-2175, 2175-2176, 2176-2177, 2177-2178, 2178-2179, 2179-2180, 2180-2181, 2181-2182, 2182-2183, 2183-2184, 2184-2185, 2185-2186, 2186-2187, 2187-2188, 2188-2189, 2189-2190, 2190-2191, 2191-2192, 2192-2193, 2193-2194, 2194-2195, 2195-2196, 2196-2197, 2197-2198, 2198-2199, 2199-2200, 2200-2201, 2201-2202, 2202-2203, 2203-2204, 2204-2205, 2205-2206, 2206-2207, 2207-2208, 2208-2209, 2209-2210, 2210-2211, 2211-2212, 2212-2213, 2213-2214, 2214-2215, 2215-2216, 2216-2217, 2217-2218, 2218-2219, 2219-2220, 2220-2221, 2221-2222, 2222-2223, 2223-2224, 2224-2225, 2225-2226, 2226-2227, 2227-2228, 2228-2229, 2229-2230, 2230-2231, 2231-2232, 2232-2233, 2233-2234, 2234-2235, 2235-2236, 2236-2237, 2237-2238, 2238-2239, 2239-2240, 2240-2241, 2241-2242, 2242-2243, 2243-2244, 2244-2245, 2245-2246, 2246-2247, 2247-2248, 2248-2249, 2249-2250, 2250-2251, 2251-2252, 2252-2253, 2253-2254, 2254-2255, 2255-2256, 2256-2257, 2257-2258, 2258-2259, 2259-2260, 2260-2261, 2261-2262, 2262-2263, 2263-2264, 2264-2265, 2265-2266, 2266-2267, 2267-2268, 2268-2269, 2269-2270, 2270-2271, 2271-2272, 2272-2273, 2273-2274, 2274-2275, 2275-2276, 2276-2277, 2277-2278, 2278-2279, 2279-2280, 2280-2281, 2281-2282, 2282-2283, 2283-2284, 2284-2285, 2285-2286, 2286-2287, 2287-2288, 2288-2289, 2289-2290, 2290-2291, 2291-2292, 2292-2293, 2293-2294, 2294-2295, 2295-2296, 2296-2297, 2297-2298, 2298-2299, 2299-2300, 2300-2301, 2301-2302, 2302-2303, 2303-2304, 2304-2305, 2305-2306, 2306-2307, 2307-2308, 2308-2309, 2309-2310, 2310-2311, 2311-2312, 2312-2313, 2313-2314, 2314-2315, 2315-2316, 2316-2317, 2317-2318, 2318-2319, 2319-2320, 2320-2321, 2321-2322, 2322-2323, 2323-2324, 2324-2325, 2325-2326, 2326-2327, 2327-2328, 2328-2329, 2329-2330, 2330-2331, 2331-2332, 2332-2333, 2333-2334, 2334-2335, 2335-2336, 2336-2337, 2337-2338, 2338-2339, 2339-2340, 2340-2341, 2341-2342, 2342-2343, 2343-2344, 2344-2345, 2345-2346, 2346-2347, 2347-2348, 2348-2349, 2349-2350, 2350-2351, 2351-2352, 2352-2353, 2353-2354, 2354-2355, 2355-2356, 2356-2357, 2357-2358, 2358-2359, 2359-2360, 2360-2361, 2361-2362, 2362-2363, 2363-2364, 2364-2365, 2365-23

of the probable costs of: Abolition of

Combined Statement

Yours Truly,
 John T. McEwen

Excerpt from R. W. D. Cook

Chapter VII. PARIS, 787 to 801.

Part 11. — Any development of a project that might necessitate a work in progress, and a re-estimation of impact on the future execution of the work as first mentioned, must be covered by a supplementary estimate.

Part 119 - A Revised Formula must be followed when there are a certain number of items selected either from the rules to be used or from a list of any other what you, except the following 119 part.

1944, 1949. When Earl H. Smith submitted his report to be recognized by a committee of the House (P. W. H. Form No. 110). It is the duty of the Executive and the Senate to make a report to the House on the progress of the program and to recommend a plan to continue the program and to recommend a plan to continue the program. The House of Representatives will be the first to make a report to the Senate on the progress of the program and to recommend a plan to continue the program.

Page 301. Word between dashes should be advanced to end of the paragraph and set in under the same line as "Kathryn" instead. Paragraph should be reworded to read: "The collection of papers in this volume was made by [name] from the [name] papers." (25 words total)

Journal of Criminal Justice 31(3) 29-39

1978-1979

Release 9-25-74

February 1972

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

[illegible]

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised Estimate.
Wall cutting	Original	...	nil		nil			
	Revised	1	7007 cft	22/-	1541	1541		
Excavation	Original	1	13485 cft	6/-	80			
	Revised	2	18864 cft	14/-	264	184		
Lime concrete in foundations	Original	2	14564 cft	20/-	2912			
	Revised	3	2451 cft	47/-	1152		1760	
P.O. Concrete	Original	...	nil		nil			
	Revised	4	1389 cft	183/-	2542	2542		
R.S. Lime masonry	Original	3	21116 cft	28/4	5965			
	Revised	5	27559 cft	51/13	14278	8313		
R.C. Concrete including iron work	Original	16	972 cft	2/10	2552			
	Revised	6	1148 cft	3/8	4018	1466		
Cement rendering	Original	...	nil		nil			
	Revised	7	1903 Sft	22/-	419	419		
Paripan coating	Original	...	nil		nil			
	Revised	8	1653 Sft	9/-	149	149		
Sheet iron roof including roof trusses.	Original	20			8388			
	Revised	9, 15, 16, 17			6643		1745	
Lime pointing	Original	...	nil		nil			
	Revised	10	96292 Sft	4/9	439	439		
Sal wood work	Original	12	77 cft	4/3	346			
Chair wood work	Revised	11	48.16 cft	3/4	157		189	
Sliding door	Original	15	100 Sft	3/-	300			
	Revised	12	2 No.		500	200		
Teak wood door leaves	Original	13	563 Sft	2/8	1408			
	Revised	13	525 Sft	2/4	1161		227	
Total or carried over					15,25	3,321		

On account of change and of design.

On account of increased cost & change of design.

Saving owing to alterations in the design of the buildings

Not included for in the original estimate

Owing to increased quantities and rates.

Note—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered

If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face over pages and rates.

Owing to increased quantities and rates.

Not included for in the original estimate.

-do- -do- -do-

Saving on the original estimate.

Not allowed for in original estimate.

Saving due to a smaller quantity of material being used

Increased cost of material

Saving due to reduction in rates allowed for in original estimate

COMPARATIVE STATEMENT--(concluded).

NOTES:

17

Manual Form No.

Page

UNITED PROVINCES.

2. DISTRICT

DIVISION

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

if the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final surveys should be quoted in the table of references, with any fresh or foreness, *not* quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and tables to record in each case that they "will be the same as in the (Original Estimates (No. ---)) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-termed "Addenda to Revised Estimate," and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extracts from F. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801.

Para. 32.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 108 — A Revised Estimate must be submitted when the original estimate is likely to be exceeded either from the rules being found in efficient or from any cause whatever, except as mentioned in para. 191.

July 1, 1911. When Report No. 19 is submitted it will be accompanied by a comparative statement (P. W. D. Form No. 119). It is the duty of the Chief Executive and the Superintendent Engineer to watch carefully the progress of expenditures, and to see that the General Accounting is submitted directly to the Chief Executive. The Deputy Accounting General, Philip Hays, will be responsible for reporting all expenditures, and for obtaining the items which are likely to result in the estimate to be enclosed.

Page 891 - "And progress reports such as
divided various in the composition of a nation as
under the influence of a variety of human
factors, the progress of each race in a
civilized state in which the influence of
progressive factors is a product of the
Virginia Plan."

Number of Original Names

of the Budget Committee.

1. *Chlorophyll*

D. Lorenzo 2 of

Discussion

[illegible]

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised Estimate.
Brought forward.					15,253	3,921		
Stone paving	Original	21	5887 Sft	15/-	883			
	Revised	14	750 Sft	48/-	360		523	
								Saving owing to change in design.
Painting and varnishing.	Original		nil		nil			
	Revised	18	1403 Sft	7/8	165	105		
								Not allowed for in original estimate.
Painting to iron trusses	Original	"	"	"				
	Revised	19		L.S.	70	70		
								-do- -do- -do-
Pilling and site clearance	Original	22			517			
	Revised	20 & 22			127		390	
								Saving owing to change in design.
Saucer drain	Original		nil		nil			
	Revised	21	2112 Sft	-/10/-	1320	1320	1320	
								Not allowed for in original design.
Stone arch masonry	Original	4	286 Cft	30/-	86		86	
	Revised	nil			nil			
								NOTE—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered. If this page does not suffice, continue the explanation on a separate manuscript sheet in the left margin of the design of the building. Saving owing to alteration in the design of the building.
Iron work.	Original	5	1.8 Cwt	74/-Cwt	133		133	
	Revised	nil	nil		nil			
R.S.Beams	Original	6	23.43 Cwt	25/-Cwt	586		586	
	Revised		nil		nil			...do... ..do...
Stone work	Original	7	52 Cft	6/8 Cft	338		338	
	Revised		nil		nil			...do... ..do...
Concrete over roof	Original	8	918 Cft	21/4	195		195	
	Revised		nil		nil			...do... ..do...
lime plaster	Original	9	126088 Sft	8/8	486		486	
	Revised		nil		nil			...do... ..do...
Gement pointing	Original	10	9409 Sft	5/8	517		517	
	Revised		nil		nil			...do... ..do...
3" Vitrified tile flooring	Original	11	3920 Sft	8/-Sft	1960		1960	
	Revised		nil		nil			...do... ..do...
Total or carried over					15743		3135	

COMPARATIVE STATEMENT (concluded).

NOTES.

(F)

Manual Form No. 69. \

Page continued

UNITED PROVINCES.

DISTRICT.

DIVISION,

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No. (Number and number of the Revised Estimate)

of the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final sanctions should be quoted in the table of references, with any fresh forclosures, and quoted in previous sanctioned estimates.

5. "It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and notes to record in each case that they " will be the same as in the Original Estimates (No. ———) with the following exceptions " (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-identified "Addition to Revised Estimate of _____" and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from W. D. Coda.

CHAPTER VII, PARAS. 787 TO 801.

Para. 3.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper extension of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 8.—A Revised Bill must be submitted when the original document is liable to be excised either from the rules being found in violation or from any cause whatever, except as mentioned in par. 19.

[illegible]

7-21-50. When excessive occupational stress or advanced aging has contributed to the work of a leader in the training of a young medical officer, the excessive stress of duty will be a contributing factor in which the leader will be given credit for stress as a factor in the evaluation of the leader's performance.

Amount of Original Estimate

of the Revised Edition

Introduction

1990

1941

Act 1742 of 1997

Sub-heads of Work in which differences occur.	Serial No. of sub-heads,	Quantity,	Rate.	Cost. Rs.	Ex-ces. Rs.	Saving, Rs.	Serial No. of sub-heads in revised Esti- mate;
Brought Forward.					16748	9135	
White washing Original ...	14	10868 Sft -/6/6 2	43			43	Saving owing to change of design.
Revised ...		nil		nil			
Cornice Original ...	17	151 Sft -/8/-Sft	76			76	Saving owing to the change in the design of the building
Revised ...		nil	n il				
Chir wood planking Original ...	18	21	8/-each	168		1 68	-do-
¾" thick. Revised ...		nil		nil			-do-
Sheet iron sunshadeOriginal ...	19	4194 Sft	21/4 Sft	891		891	-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Original ...							-do-
Revised ...							-do-
Total or carried over					16748	9135	

COMPARATIVE STATEMENT - (concluded).

NOTES.

Mantel Form No. 6

Page _____

UNITED PROVINCES.

Maini Tal DISTRICT.

Second DIVISION.

Public Health Department

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

if the probable cost of Power Station

Final Index

Waini Tai Hydro Electric Supply

Extract from E. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801.

Para. 12.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as then sanctioned, must be covered by a supplementary estimate.

Para. 118.—A Revised Estimate must be submitted when the amount disbursed is likely to be exceeded either from the rates being found in sufficient or from any cause whatsoever, except as mentioned in par. 119.

1402. 1403. When Revised Estimates are submitted it must be accompanied by a comparative statement (P. W. D. Form No. 118). It is the duty also of the Executive and the Superintending Engineer to watch carefully the progress of expenditure, and to see that a Revised Estimate is submitted directly in the necessary times. The Deputy Commandant General Works will be responsible for reporting all excess or variations in quantities of work which are likely to reduce the estimate to be expended.

Part 403. When exercises occur at such an advanced period in the construction of a ship as to render it impossible to do a Revised Estimate thereof, the exercise will be made with a construction cost, in which details need not be given when the exercise is only a part of the original estimate.

Amount of Original Estimate: 28,850

of the Record Form No. 32, 20-

PLANNED

Differences of Section

[illegible]

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost, Rs.	Excess, Rs.	Saving, Rs.	Serial No. of sub-heads in revised Estimate.
Tail Race	Original	...			7629			
	Revised	...			7950	321		
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
Total or Carried over								

On account of increased rates.

Note—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised Estimate.	
Excavation	Original	1(a)	2982 cft	6/-½	18				On account of increased rates & change of design.
	Revised	1	4658	14/-½	65	47			
R.S. Masonry in lime	Original	3	3961 cft	28/4	1113				Owing to change in design of the buildings and increased cost of material.
	Revised	2	11415 cft	51/5½	5845	4730			
R.S. Masonry in clay	Original	4	5446 cft	21/-½	1144				-do- -do- -do-
	Revised	3	4197 cft	46/-½	1931	787			-do- -do- -do-
Reware patent slates	Original		nil		nil				Owing to the change of design in the buildings.
	Revised	4	36 sft	1/12 sft	63	63			-do-
R.C. Work including iron	Original	5	54 cft	2/10	247				On account of increased rates and change of design.
	Revised	5	164 cft	3/8 cft	574	327			NOTE - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered. If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.
Sal wood work	Original	11	322 cft	4/8 cft	1449				Over estimated in original design and alterations in design
Chir wood work	Revised	6	318 cft	3/4	1033		416		
1½" Chir wood planking	Original		nil		nil				Owing to the change of the design in the buildings.
	Revised	7	986 sft	94/9½	932	932			
¾" Chir wood planking	Original	12	1573 sft	21/10½	540				On account of increased rates and change of design.
	Revised	8	1731 sft	30/5 ½	525	185			
Lime pointing	Original		nil		nil				Owing to change of design.
	Revised	9	2736 sft	4/9½	125	125			
Lime plaster	Original	8	8297 sft	4/8½	373				On account of increased rates and change of design.
	Revised	10	4534 sft	8/8½	385	12			
Coal tarring	Original								Not allowed for in original estimate.
	Revised	11	L.S.		15	15			
Site clearance	Original								-do- -do-
	Revised	12	L.S.		60	60			
White washing	Original	17	8297 sft	7/6/-½	34				On account of increased rates and change of design.
	Revised	15	4534 sft	7/10/4½	60				
Total or Carried over					7223	423			

COMPARATIVE STATEMENT--(concluded).

NOTES:

(7)

Standard Form No. 64

Page 12 of 12

UNITED PROVINCES.

DISTRICT.

DIVISION.

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No.

of the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (K) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final decisions should be quoted in the table of references, with any fresh references, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and notes to record in each line that they "will be the same as in the Original Estimates (No. ———) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-designated "Addendum to Revised Estimate No." and enumerated on page 1 of the Revised Estimate along with any other plans.

Extract from W. D. Code.

CHAPTER VII, PAGES 797 TO 801.

Para. 42.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para 718 - A Revised Estimate must be submitted when the current estimate is likely to be exceeded either from the material being found insufficient or from any cause whatever, except as mentioned in para. 717.

Form 779. When Federal Income tax is submitted it must be accompanied by a comparative statement (P. W. L. Form No. 114). It is the duty of the Executive and the Surveying Engineer to watch carefully the progress of expenditure, and to conduct a revised estimate is submitted, and the necessary means. The Deputy Accountant General, Public Works, will be responsible for the recording of all accounts in regard to expenditure, which are liable to receive the attention of the Executive.

Page 801.—With anxious regard to the advancement of the education of a young teacher in general, and the general culture of the young, and others will be dealt with in a few paragraphs in which some hints may be given as to the ways in which to reach the young school.

Abstract of Original Estimate.

of the Revised Estimate.

1. Alcove

Difference

Servings

THE EXCISE AND REVENUE

New process of saving

Sub-heads of Work in which differences occur.	Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in Revised Estimate.	
Brought forward.					7283	420		On account of increased rates & change of design.
Panelled door leaves	Original ... 13	345 Sft	1/6 Sft	475				
1 1/2"	Revised ... 14	255 Sft	2/- Sft	510	35			-do-
Earth filling	Original ... 1(b)	711 Cft	3/- Sft	2				
	Revised ... 15	810 Cft	14/- Sft	11	9			
lime concrete	Original ... 2 & 7	1879 Cft	20/- Sft	375				
	Revised ... 16	314 Cft	47/- Sft	148		227		Owing to change of design and saving in quantity but an increase in cost of material
Iron sheeting	Original ... 14	1904	105/- Sft	1999				
	Revised ... 17	1806 Sft	65/- Sft	1174		825		Owing to change in design. An increase in quantity and a fall in price for material.
Ridge	Original ...							
	Revised ... 18	151 Lft	1/9 Rft	236	236			Owing to change of design.
Iron work	Original ... 16	2 Cwt	74/- Cwt	148				NOTE - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
	Revised ... 19	4.31 Ma	30/- Ma	129		19		If this page does not suffice, continue the explanation on a separate manuscript.
Painting & Vernishing	Original ... 15	5456 Sft	5/11 Sft	313				Owing to change of design and a fall in price for material.
	Revised ... 20	L.S.		100		213		
Sewer drain	Original ...							
	Revised ... 21	875	7/10/-	547	547			Owing to change of design in the buildings.
Mill cutting	Original ...							
	Revised ... 22	18619 Cft	22/- Sft	4096	4096			Owing to the new site required for the pump house.
Battened doors	Original ... 15	78 Sft	1/4 Sft	98		98		Owing to change of design.
Shut and window	Revised ...	134 Cft	20/- Sft	58		58		-do-
4" slate flooring	Original ... 9	1994 Sft	35/5 Sft	704		704		-do-
	Revised ...							
Salwood railing	Original ... 10	126 Lft	1/- Rft	126		126		-do-
5' high	Revised ...							
	Original ...							
	Revised ...							
Total or carried over					12284	2690		

Sub-heads of Work in which differences occur.	Serial No. of sub heads	Quantity.	Rate.	Cost. Rs.	Excess, Rs.	Saving. Rs.
Drought or ward				12206		3303
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Total excesses and savings				12206		3303
Net saving at closing						8793

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a Comparative Statement and Explanation of Differences, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final decisions should be quoted in the table of references, with any fresh references, *not quoted in previous sanctioned estimates.*

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates to record in each case that they "will be the same as in the Original Estimates (No. -----) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-labeled "Amendments to Revised Estimate." and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from P. W. D. Code

CHAPTER VII, PARAS. 787 TO 801

Para. 82.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 788.—A Revised Estimate must be submitted when the amount of estimate is likely to be exceeded either from the work being found in advance or from any cause that, for effect, as mentioned in para. 791.

Para. 240. When Revised Estimate is submitted it must be accompanied by a comparative statement (P. W. D. Form No. 119). He is the only officer of the Executive and the Superintending Engineer to watch generally the progress of expenditure, and to see that Revised Estimate is submitted at regular intervals. Major, will be responsible for securing all works on P. W. D. at the minimum of cost, which are liable to cause the estimate to be exceeded.

Para. 301.—When expenses incurred upon an advanced period of the production of a work, are rendered in pursuance of a Revised Estimate, for purposes of the estimate will be dealt with as a supplementary work on which advance need only be given when the same is that of part of the Original Estimate.

UNITED PROVINCES.

Maine 2nd DISTRICT

Second DIVISION

Public Health Department.

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of Staff Quarters,

Main Tail Hydro-Electric

Scheme 2

Arrested Original: Williams 9629

of the *Journal of the American Medical Association* (JAMA) and the *New England Journal of Medicine* (NEJM) are the most widely cited journals in the field of medicine. The *JAMA* is published by the American Medical Association (AMA) and the *NEJM* is published by the Massachusetts Medical Society. Both journals are known for their high standards of scientific rigor and their focus on clinical research. The *JAMA* is a weekly journal, while the *NEJM* is published twice a week. Both journals are available in print and online formats. The *JAMA* is a member of the American Medical Association, while the *NEJM* is a member of the Massachusetts Medical Society. Both journals are highly respected in the medical community and are considered essential reading for physicians and other healthcare professionals. The *JAMA* and the *NEJM* are both published by the American Medical Association, which is a non-profit organization dedicated to improving the health of the American people. The *JAMA* and the *NEJM* are both published by the American Medical Association, which is a non-profit organization dedicated to improving the health of the American people.

1992

Expenditure of

Introduction

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Ex. est. Rs.	Saving. Rs.	Serial No. of sub-heads in revised estimate.	
Excavation	Original	...	1	1330 Cft 6/-%o	8				
	Revised	...	35	3038 Cft 14/-%o	43	35			On account of increased rates & change of design.
Lime masonry	Original	...	2	2351 Cft 28/4%	644				
	Revised	...	2	4971 Cft 51/3%	2545	1901			Change in design for increased quantities. Cost of lime & labour under estimated in original estimate.
Cement masonry	Original	...							
	Revised	...	3	3.23 Cft 130/-%	4	4			Owing to change in design
Clay masonry	Original	...	5	2629 Cft 21/-%	552				
	Revised	...	4	1626 Cft 46/-%	748	196			Change in design for decreased quantities. Rates increased to meet present cost of material and labour.
R.C. Work including iron	Original	...	6	50 Cft 2/10 Cft	131				
	Revised	...	5	113 Cft 3/8 Cft	396	265			Owing to change in design. Rate for cement under estimated in original estimate.
Lime plaster	Original	...	11	5803 Sft 4/8 %	261				
	Revised	...	6	2855 Sft 8/8 %	243		18		NOTE--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered. If this page does not suffice, continue the explanation on a separate manuscript sheet in this form: Change in design. A saving in quantity. Increased rate to meet cost of lime.
Lime pointing	Original	...							
	Revised	...	7	1894 Sft 4/9 %	86	86			Owing to change in design
Sel wood work	Original	...	9	131 Cft 4/8	590				Change in design. Rate reduced to meet present cost of timber
Chir wood work	Revised	...	8	185 Cft 3/4 Cft	601	11			-do-
4" planking for roof	Original	...	10	1505 Sft 21/10%	325				
	Revised	...	9	1836 Sft 30/5 %	557	232			Change in design. Rate increased to meet cost of labour
Iron sheeting	Original	...	17	1760 Sft 105%	1848				
	Revised	...	10	1836 Sft 65/-%	1193		655		Reduced quantities. Rate reduced to meet present market rate for iron sheeting.
Ridge	Original	...							
	Revised	...	11	102 Sft 1/9 Sft	159	159			Not allowed for in original estimate.
Glazed & panelled doors & windows	Original	...	8	343 Sft 1/6 Sft	472				
	Revised	...	12	272 Sft 2/- Sft	544	72			Change in design. Reduced quantities. Rate increased to meet cost of labour.
Cement concrete	Original	...							
Filling	Revised	...	13	156 Cft 183/-%	285	285			Owing to change in design.
Total or carried over					3246	673			

COMPARATIVE STATEMENT--(concluded).

NOTES:

(I)

Manual Form No.

Page _____

UNITED PROVINCES.

DISTRICT

DIVISION.

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No.

of the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final surveys should be quoted in the table of references, with any fresh references, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates to record in each case that they "will be the same as in the Original Estimates (No. ———) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-identified "Accomplishments to be Revised Estimate No. _____" and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from W. D. Conner

CHAPTER VII. PANAS, 797 to 801.

Para. 32. — Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 718.—A Revised Estimate must be submitted when the amount of estimate is likely to be expended either from the rate, or to be raised, or to be paid from any source whatever, except as mentioned in par. 791.

form 749. When Revised Estimate is submitted it must be accompanied by a comparative statement (P. W. D. Form no. 118). It is the duty of the Executive and the Superintending Engineer to watch carefully the progress of expenditure, and to see that Revised Estimate is submitted exactly in the prescribed form. The Deputy Commissioner, District Public Works, will be responsible for securing all expenditure in terms of the estimate of work which are liable to come the estimate to be exceeded.

Para. 301.—When expenses exceed the cash an advanced payment of the construction of a house is to render the submission of a Revised estimate unnecessary, the excess will be dealt with in a completion report in which details must only be given when the excess is over 5 per cent of the Original Estimate.

Amount of Original Estimate

of the boys and girls.

EXHIBIT

Difference: $\bar{y}_1 - \bar{y}_2 = 1.0 - 0.5 = 0.5$

Sub-heads of Work in which differences occur.	Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Ex. est. Rs.	Saving. Rs.	Serial No. of sub-heads in Revised Estimate.	
Brought forward.					3246	673		
Lime concrete filling Original ...	3	1056 Cft	20/-	211				Change in design. Reduced quantities. Rate increased to meet cost of lime Sand and labour.
Revised ...	14	468 Cft	47/-	220	9			On account of increased rates and change of design.
Earth filling Original ...	7	535 Cft	3/-	2				
Revised ...	15	1268 Cft	14/-	18	16			Change in design and rate increased owing to level for earth.
Iron work Original ...	15	1.5 Cwt	74/-	111				Change in design. Rate reduced to meet present cost of iron material.
Revised ...	16	2md. 221bs	50/-	68	43			
Site Clearance Original ...	18			385				
Revised ...	17	L.S.		30	355			Change in design.
Painting & Varnishing Original ...	13	3982	5/11	215				
Revised ...	18	L.S.		60	155			-do-
Coaltarling Original ...								Note - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
Revised ...	19	L.S.		15	15			If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.
Saucer drain Original ...								-do-
Revised ...	20	906 Srt	-/10/Srt	566	566			Not allowed for in original estimate.
3" slate flooring Original ...	4	945 Sft	35/5	334		334		Owing to change in design.
Revised ...		nil		nil				-do-
White washing Original ...	12	5303 Sft	-/6/6	24		24		Owing to change in design.
Revised ...		nil		nil				-do-
Stone work Original ...	14	8 Cft	6/8	52		52		Owing to change in design.
Revised ...								-do-
Sheet iron sunshade Original ...	16	8 No.	3/-each	48		48		-do-
Revised ...								
Mistake in totalling in original estimate Original ...						20		Adjustment with original estimate
Revised ...								
Original ...								
Revised ...								
Total of differences					3052	152		

COMPARATIVE STATEMENT--(concluded).

NOTES.

(7)

Manual Form No.

Page _____

UNITED PROVINCES.

DISTRICT _____

Second DIVISION

Public Health Dept.

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No.

of the probable cost of superintending the

1943

Malindi Tel Hydro-Electricity Supply

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (H) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final estimates should be quoted in the table of references, with any fresh resources, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of (both specifications, calculations, measurements, and rates to record in each case that they "will be the same as in the Original Estimates (No. ———) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-marked "Additions to Revised Estimate" and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from A. W. D. Code:

Chapter VII, PARAS. 787 to 801.

Para. 22.—Any development of a project should be necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 116.—A Revised Estimate must be submitted when the original estimate is likely to be exceeded either on the basis of a trend in the same direction or on any cause whatever, except as mentioned in para. 119.

1906, 1907. When General Canby is authorized to make a comparison of a comparative statement (P. W. H. Form No. 119). It is the duty of the the Assistant and the Superintendent Engineer to make a study of the progress of each day, and to see that the work is carried out directly by the necessary means. The Deputy Assistant Engineer, who is responsible for the progress of the work, will be responsible for the progress of the work, and will be responsible for the progress of the work.

2000-80-11-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-10

of the Revised Estimate. 1890.

EXCESS 2167

12-2-1960 or

1987

[illegible]

Sub-heads of Work in which differences occur.		Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised Estimate.	
Earth work	Original ...	1	247 Cft	6/-%o	1				
	Revised ...	1	520 Cft	14/-%o	7	6			On account of increased rates and change of design.
Hill cutting	Original ...								
	Revised ...	2	1960"	22/-%o	43	43			-do-
Lime masonry	Original ...	3	446 Cft	28/4%	126				Change in design. Increased quantities. Rate increased to meet cost of Lime sand and labour.
	Revised ...	3	1207 Cft	51/3%	525	399			-do-
Clay masonry	Original ...	4	594 Cft	21/-%	125				Change in design. Reduced quantities. Rate reduced to meet present cost of XXXXXX material & labour.
	Revised ...	4	523 Cft	45/-%	240	115			-do-
Sal wood work	Original ...	8	15 Cft	4/8 Cft	68				Change in design. Increased quantities. Rate reduced to meet present cost of timbers.
Chir wood work	Revised ...	8	2219 Cft	3/4 Cft	72	4			
1" Planking	Original ...	9	127 Sft	21/10%	29				Note--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
	Revised ...	6	240 Sft	30/5%	73	44			If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to the next page.
Ridging	Original ...								-do-
	Revised ...	7	32"	1/9 Rft	50	50			Owing to change in design
Iron sheeting including fixing	Original ...	14	133 Sft	105/-%	140				Change in design. Increased quantities. Rate reduced to meet present cost of Iron sheeting.
	Revised ...	8	240 Sft	65/-%	156	16			
Lime pointing	Original ...				nil				Owing to change in design.
	Revised ...	9	884 Sft	4/9%	40	40			-do-
Lime plaster	Original ...	10	1265 Sft	4/8%	61				Owing to change in design. Rate increased to meet cost of material and labour.
	Revised ...	10	404 Sft	8/8%	34		27		
Earth filling	Original ...				nil				
	Revised ...	11	120 Cft	14/-%o	2	2			Owing to change in design.
Stone paving	Original ...				nil				
	Revised ...	12	30 Cft	48/-%	14	14			-do-
Site clearance	Original ...	15			122				
	Revised ...	15	L.S.		50		132		-do-
Total or carried over						722	159		

Sub-heads of Work in which differences occur.		Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Ex. est. Rs.	Saving. Rs.	Serial No. of sub-heads in revised estimate.
Brought forward.						733	159	
White washing	Original ...	11	1365 Sft	~6/-	6			
	Revised ...	14	404 Sft	~10/6	3		3	
On account of increased rates and change of design.								
1 1/2" Door Leave	Original ...	7	52 Sft	1/4 Sft	65			
	Revised ...	15	54 Sft	2/- Sft	108	43		
-do-								
R.S. Work including Iron	Original ...	5	9 Cft	2/10 Cft	24			
	Revised ...	16	13.13 Cft	3/8 Cft	46	22		
-do-								
Iron work	Original ...	13	0.25 Cwt	74/- Cwt	19			
	Revised ...	17	15.54 lbs	30/- Mds	6		13	
Change of design.								
Coaltering	Original ...							
	Revised ...	18	L.S.		10	10		
-do-								
Painting & Varnishing	Original ...	12	392 Sft	5/11	22			
	Revised ...	19	L.S.		25	3		
On account of increased rates and change of design.								
Stone lime concrete	Original ...	2	129 Cft	20/-	26		26	
	Revised ...							
Change of design.								
3" slate flooring	Original ...	6	80 Sft	35/5	28		28	
	Revised ...							
-do-								
Mistake in totalling in original estimate	Original ...							
	Revised ...					2		
mistake in totalling								
	Original ...							
	Revised ...							
	Original ...							
	Revised ...							
	Original ...							
	Revised ...							
	Original ...							
	Revised ...							
Total or carried over						812	229	

COMPARATIVE STATEMENT--(concluded).

NOTES:

(F)

Manual Form No. 69.

Page _____

UNITED PROVINCES.

Neind lcl DISTRICT.

Second DIVISION,
Public Health Department.

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of Sweepers Hut

Maini Tel. Hydro Electric Supply

Extract from P. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801.

Para. 32.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 118.—A Revised Estimate must be submitted when the original estimate is likely to be exceeded either from the rates being found insufficient or from any cause whatever, except as mentioned in par. 117.

Para. 146. When detailed estimate is submitted it must be accompanied by a comparative estimate (P. W. D. Form No. 119). It is the duty alike of the Executive and the Superintending Engineer to watch carefully the progress of expenditure, and to see that a fixed estimate is expended directly and indirectly in accordance with the approved estimates. The Deputy Accountant-General, Public Works, will be responsible for reporting all expenditure in terms of quantities of work which are likely to cause the estimate to be exceeded.

Para. 801.—When executed cover is such an advanced part of the construction of a work as to render the reproduction of a Revised Edition unnecessary, the editor will be dealt with in a composition report in which details need now be given which the editors in 1897 had a right to the original Edition.

Annals of Original Bandages 920

of the Revised Estimate, 1924

11-10-58

Distance of _____ of _____

12011

[illegible]

[illegible]

COMPARATIVE STATEMENT - (concluded).

NOTES:

(F)

Manual Form No. 69.

Page _____

UNITED PROVINCES.

Waini Tal DISTRICT.

Second DIVISION.

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Page No.

of the probable cost of Inspection House

Naini Tal Hydro Electric Scheme.

Amount of Original Estimate 1472

of the Nevada Indians. 111

Figure 1

Difference of

Abstract

Sub-heads of Work in which differences occur.	Serial No. of sub heads	Quantity.	Rate.	Cost. Rs.	Excess. Pa.	Saving. Rs.
		Brought forward				3472
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Original ...						
Revised ..						
Original ..						
Revised ..						
Total excess and saving.						3472
No excess or saving.						3472

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a Comparative Statement and Explanation of Differences, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. the Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final sanctions should be quoted in the table of references, with any fresh references, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates to record in each case that they "will be the same as in the Original Estimates (No.) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate, should be clearly re-identified "Accompaniments to Revised Estimate No." and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from E. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801.

Para. 32.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 183.—A Revised Estimate must be submitted when the original estimate is likely to be exceeded either from the rates being found insufficient or from any cause whatever, except as mentioned in par. 181.

Form 100. When Revised Estimates is submitted it must be accompanied by a comparative statement (P. W. D. Form No. 119). It is the duty alike of the Executive and the Superintendent Engineer to watch carefully the progress of expenditure, and to see that Revised Estimates is submitted directly to the necessary authorities. The Deputy Accountant General, Public Works, will be responsible for reporting all excess in rates or in quantities in work which are likely to cause the estimate to be exceeded.

Para. 501.—When processes occur at such an advanced period of the construction that work is to render the submission of a Revised Estimate purposes, the process will be dealt with in a completion report in which details need only be given when the same is shown to be part of the Original Estimate.

Sub-heads of Work in which differences occur,		Serial No. of sub heads,	Quantity,	Rate.	Cost. Rs.	Ex. est. Rs.	Saving. Rs.	Serial No. of sub-heads in revised estimate.
Machinery	Original	...			127000			
	Revised	...			223301	96301		
On account of increased cost and rise in exchange rate								
Lighting points	Original	...			500			
	Revised	...			1000	500		
-do-								
Office furniture	Original	...			750			
	Revised	...			750			
-do-								
Workshop equipment	Original	...			27150			
	Revised	...			5000		22150	
Lea recorder complete	Original	...			nil			
	Revised	...			1260	1260		
On account of change of design.								
Note—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.								
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.								
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
Total or carried over					98001	22150		

Sub-heads of Work in which differences occur.	Serial No. of sub heads.	Quantity.	Rate.	Cost. Rs.	Ex cas. Rs.	Saving, Rs.	Serial No. of sub-heads in Revised Estimate.
Valve chamber at Original ...				nil			
commencement of inlet pipe Revised ...	1			2482	2482		
Inlet chamber and 20" intake connection. Original ...	9			10533			
Revised ...	2			40715	30182		
Thrust block and pillars Original ...	8			4932			
for pipe line. Revised ...	3			93552	88620		
Steel & C.I.Pipes 10" Original ...	1 to 7			199560			
Revised ...	4			301238	101678		
Pipe specials & to be supplied at Power house by Mather & Platt. Original ...				n il			
Revised ...	5			56464	56464		
Specials,grooves Sc., to be supplied at inlet chamber. Original ...				nil			
Revised ...				8700	8700		
Original ...							
Revised ...							
Original ...							
Revised ...							
Original ...							
Revised ...							
Original ...							
Revised ...							
Original ...							
Revised ...							
Original ...							
Revised ...							
Total or carried over				238125	nil		

On account of change of site.

Change of site,change of design & increased rates

Change of alignment & increased rates

Rise in exchange rate.

Change of design(recommended by manufacturers)

Note—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.

[illegible]

COMPARATIVE STATEMENT - (concluded).

NOTES

(2)

Manual Form No. 69.

Page _____ TO: _____

UNITED PROVINCES.

Maini Tal. District.

Second. DIVISION.

Public Health Dept.

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No. contains the original description

of the probable cost of Transmission and...

distribution.

Raini Tal Hydro Electric Scheme.

[illegible]

1. In the United Provinces, this form is to take the place of Code Form No. 3, prescribed in the Codes quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (b) which will immediately precede the abstract on Form V or VI.

3. The Revised Patients should be complete in itself, and must not contain any of the descriptions except plans forming part of the Original Estimate.

4. The reports above refer to the original estimates.

The original and all subsequent administrative and financial records should be quoted in the table of reference, with any fresh resources, not quoted in previous statements and estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, arrangements, and the like not to indicate that they "will be the same as in the original Estimates (No. 1000000)" with the following exception:—(which should be given in full details.)

6. Pages belonging to an Original Belong and remain under the part of a Revised Belong should be clearly indicated as "Revised Belongs to Revised Belong" and commented on page 1 of the Revised Belong along with any fresh copy.

History from W. D. Child.

Chapter VII, Paras. 797 to 801.

Paragraph 4. The development of a project thought necessary while a war is in progress, which is not fairly contingent on the proper execution of the work is thus sanctioned, must be covered by a supplementary estimate.

Para. 28. A Revised Application is submitted when the current duration of the L.B. is extended either from the original term of duration or from any other previous period as mentioned in para. 18.

June, 1947. When Robert H. Ingham submitted his report, it was signed by a committee composed of R. W. Ford and H. H. H. It is the opinion of the Society and the Subcommittee together to have provided the progress of development, and to see that a good enough is obtained directly and indirectly. The Director of the National Council of the Arts will be responsible for reporting all existing and to be developed in the future, which is the responsibility of the National Council.

Page 405. When a person reads a page in a printed paper of the contents of a book, and finds it is the same as a printed volume referred to, the person will be said to be a copyholder, in which case he will not be free until a copy is made of the copy of the original record.

Amount of Original Materials: 277761

of the Rev. Mr. Wilson. 52 1000

01980 247540

Difference of Savings

Sub-heads of Work in which differences occur.		Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised Estimate.
Excavation	Original	1	1716 Cft	6/-	10			
	Revised	2	2817 Cft	16/-	46	36		
Concrete in lime	Original	2	161 Cft	20/-	152			
	Revised	3	870 Cft	35/-	305	153		
R.S.Lime masonry	Original	3	1599 Cft	28/4	452			
	Revised	4	7091 Cft	54/-	3829	3377		
-do- in clay	Original	4	4168 Cft	21/-	875			
	Revised	5	548 Cft	48/-	263		612	
Gernice complete	Original	5	100 lft	1/4-rft	25		25	
	Revised				nil			
P.O.concrete lintels	Original	6	15 Cft	2/10Cft	39			
	Revised	7	58 Cft	2/6 Cft	137	98		
Arch work	Original	7	33 Cft	30/-	10		10	
	Revised				nil			
Reinforced concrete	Original	8	85 Cft	2/10Cft	203			
	Revised	6	410 Cft	3/5 Cft	1350	1155		
Doors & windows	Original	9	70 Sft	1/6 Sft	96			
	Revised	14	153 Sft	2/4 Sft	344	248		
Sal wood work	Original	10	39 Cft	4/8 Cft	176			
Chir wood work	Revised	15	32.45 Cft	3/-Cft	97		79	
Lime plaster	Original	11	3231 Sft	4/8	145			
	Revised	9	697 Sft	9/-	63		82	
1 st Stone paving	Original	12	446 Sft	35/5	147			
	Revised	8	140 Cft	33/-	46		101	
Lime pointing	Original	13	2400 Sft	2/10	60			
	Revised	11	5077 Sft	5/8	279	216		
Total or carried over					5283	909		

On account of change of design & increased of rates & quantities.

-do-

Change in design.Increased quantities.Rate increased to meet present cost of Lime sand and labbur.

Change in design.Reduced quantities.Rate increased due to cost of labour and lead of stone.

Owing to change in design.

Note--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.

If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face page.

-do-

-do-

Change in design.Increased quantities.Rate increased to meet cost of Cement and labour.

Owing to change in design.Rate increased to meet cost of labour.

-do-

Owing to change in design.Rate reduced compared with original cost.

Owing to change in design.Rate increased to meet cost of lime sand and labour.

Owing to change in design.Rate over estimated in original estimate.

Owing to change in design.Increased quantities.Rate increased to meet cost of material and labour.

COMPARATIVE STATEMENT-(concluded).

NOTES:

(13)

Manual Form No. 61

Page _____

UNITED PROVINCES.

DISTRICT.

DIVISION V.

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (B) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and financial actions should be grouped in the table of references, with any fresh resources, not quoted in previous sanctioned estimates.

5. It will amply suffice in drawing up details of fresh specifications, calculations, measurements, and notes in record in such case that they "will be the same as in the Original Retraction (No. _____), with the following exceptions" (which should be given in full detail).

6. Plans belonging to an Original Estimate and recommended as part of a Revised Estimate should be clearly re-numbered "Agreement to Revised Estimate" and enumerated on page 1 of the Revised Estimate along with any revisions.

Extract from W. D. Code.

CHARGE VII, PARAS 787 TO 801.

Para. 73.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary agreement.

Para. 113.—A.B. used for next must be understood when the word is a distance is likely to be exceeded either from the rates being found to be efficient or from any cause, which may, except as hereinafter provided, be met.

[illegible]

Page 100 of 100

Account of Original Estimate

of the Revised Estimate.

Lee98

Differences of

Savings

Sub-heads of Work in which differences occur.		Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Ex. cts. Rs.	Saving. Rs.	Serial No. of sub-heads in Revised Estimate.	
Brought forward.						5283	909		
Iron work	Original	14	3.0 Cwt	74/-cwt	222				On account of change of design and decreased rate to meet present cost of iron material.
	Revised	20	29 Mds.	30/-Mds.	870	648			
22 B.W.G. sheet iron	Original	15	537 sft	105/-%	564				On account of change of design. Reduced rate to meet present cost of iron sheeting.
	Revised	17	398 Sft	65/-%	259		305		
3" chir wood ceiling	Original	16	511 Sft	21/10%	111				On account of change of design and increased rates.
	Revised	16	288 Sft	7/-sft	126	15			
Gutters 9"	Original	17	32 lft	2/12rft	88		88		On account of change of design.
	Revised								
Down pipe 4"	Original	18	25 lft	2/8 rft	63		63		-do-
	Revised								
White washing	Original	19	5231 sft	-/6/68ft	13				Note - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered. If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.
	Revised	13	697 sft	-/10/6%	5		8		
Painting & varnishing	Original	20	1056 sft	5/11%	60				-do-
	Revised	18	395 sft	6/8%	26		34		
Site clearance	Original	21	L.S.		100				-do-
	Revised	22	L.S.		70		30		
Levelling site	Original				nil				On account of change of design and increased rates.
	Revised	1	L.S.		100	100			
Cement rendering	Original				nil				-do-
	Revised	10	464 Sft	12/-%	56	56			
Rammed earth filling	Original				nil				-do-
	Revised	12	351 Sft	14/-%	5	5			
Saucer drain	Original				nil				Owing to change of design, not allowed for in original estimate.
	Revised	19	454 Sft	-/10/-	284	284			
Coal tarring	Original				nil				-do- -do-
	Revised	21	L.S.		30	30			
Total or carried over						6421	1437		

Sub-heads of Work in which differences occur,		Serial No. of sub heads,	Quantity,	Rate.	Cost, Rs.	Ex. est. Rs.	Saving, Rs.	Serial No. of sub-heads in revised Estimate.	
Excavation	Original	...	1	1716 Cft 6/-	10				On account of change of design & increased rates.
	Revised	...	1	2021 16/-	32	22			
Concrete inline	Original	...	2	161 Cft 20/-	152		152		-do-
	Revised	...			nil				
R.S. line masonry	Original	...	3	1599 Cft 28/4	452				Owing to change in design. Increased quantities. Rate increased to cover present cost of lime sand & labour.
	Revised	...	2	7008 Cft 58/15	4130	3678			
-do- in clay	Original	...	4	4168 Cft 21/-	875				Change in design. Reduced quantities. Rate increased to cover cost of labour and lead of stone.
	Revised	...	3	548 Cft 52/12	289		586		
Cornice complete	Original	...	5	100 lft -/4-Rft 25			25		On account of change of design.
	Revised	...			nil				
P.C. concrete lintels	Original	...	6	15 Cft 2/10 Cft	39				NOTE - Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered. If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to last next page.
	Revised	...	5	58 Cft 2/8	137	98			
Arch work	Original	...	7	33 Cft 30/-	10		10		On account of change of design and cost of materials. Change in design.
	Revised	...			nil				
Reinforced concrete	Original	...	8	85 Cft 2/10 Cft	203				Change of design. Increased quantities. Rate increased to meet cost of material & labour.
	Revised	...	4	410 Cft 3/5	1358	1155			
Doors & windows	Original	...	9	70 Sft 1/6 Sft	96				On account of change of design & variation in cost of material.
	Revised	...	11	153 Sft 2/4 Sft	344	248			
Sal wood work	Original	...	10	59 Cft 4/8 Cft	176				On account of change of design & reduced rate for material.
Chir wood work	Revised	...	12	32.45 3/- Cft	97		79		
Lime plaster	Original	...	11	3231 4/8	145				- do - & increased cost for material.
	Revised	...	7	697 9/-	63		82		
3" Stone paving	Original	...	12	4168 Sft 35/5	147				-do- & reduced cost for material.
	Revised	...	6	140 33/-	46		101		
Lime painting	Original	...	13	2400 Sft 2/10	63				On account of change of design & increased rate for material.
	Revised	...	9	5077 Sft 5/8	279	216			
(Total or carried over)						5417	1035		

COMPARATIVE STATEMENT - (concluded).

NOTES:

(7)

Manual Form No. 69.

Page _____

UNITED PROVINCES.

DISTRICT _____

DIVISION _____

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of _____

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Guidelines quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a Comparative Statement and Explanation of Differences, on the Form (K) which will immediately precede the abstract on Form V or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the details except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and financial returns should be quoted in the table of reference, with any fresh figures, and quoted in previous estimated estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates to refer to the original estimate, and to the same as in the Original Estimate (No. _____) with the following exception: (which should be given in full detail.)

6. Plans belonging to an Original Estimate, and required as part of a Revised estimate, should be clearly reprinted. A copy of the original estimate, and of the Revised Estimate, should be submitted on page 1 of the Revised Estimate, along with any fresh plans.

Revised from P. W. D. Code.

CHAPTER VII, PARAS. 787 to 801.

Para. 787 - Any development of a project, though merely a variation in the original, which is not fully completed on the proper execution of the work as first estimated, must be covered by a supplementary estimate.

Para. 788 - A Revised Estimate must be submitted when the original estimate is found to be insufficient either from the rates being found to be insufficient for any cause whatever, or from an increase in the cost.

Para. 789 - When Revised Estimates are submitted, it must be accompanied by a comparative statement (P. W. D. Form No. 119). It is the duty of the Engineer and the Surveying Engineer to watch carefully the progress of the work, and to see that it is carried out in accordance with the original estimate. The original estimate should be submitted to the Public Works Department, and the Revised Estimate should be submitted to the Public Works Department, and the original estimate should be submitted to the Public Works Department.

Para. 790 - When a Revised Estimate is submitted, it must be accompanied by a comparative statement (P. W. D. Form No. 119). It is the duty of the Engineer and the Surveying Engineer to watch carefully the progress of the work, and to see that it is carried out in accordance with the original estimate. The original estimate should be submitted to the Public Works Department, and the Revised Estimate should be submitted to the Public Works Department, and the original estimate should be submitted to the Public Works Department.

Amount of Original Estimate

of the Revised Estimate

Excess

Difference

Surplus

Total excess and saving

Net excess or saving

COMPARATIVE STATEMENT

EXPLANATION OF DIFFERENCES.

Page 152

Kutchery High Sub-Station Building Contd.

Description of Work in which differences occur		Serial No. of sub-heads	Quantity	Rate	Orig. Rs.	Revised Rs.	Savings Rs.	Serial No. of sub-heads in Revised Estimate	
Brought forward.						5417	1035		
Iron work	Original	14	5.0 Cwt	74/-Cwt	222				
	Revised	18	28.33	30/-Cwt	850	628			On account of change of design & decreased rates for material.
22 B.W.G. Sheet iron	Original	15	537 sft	105/-	564				
	Revised	14	398	61/11	246		318		Change of design & reduced rate for material.
3" chair wood ceiling	Original	16	511 sft	21/10	111				
	Revised	13	288 sft	7/-Sft	126	15			On account of change of design & of increased rates for labour.
Cuttlers 9"	Original	17	32 Sft	2/12	88		88		
	Revised				nil				On account of change of design.
Down pipe 4"	Original	18	25 lft	2/8 rft	63		63		
	Revised				nil				-do-
White washing	Original	19	3231 sft	6/6	13				Here--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
	Revised	10	697	7/10/6	5		8		If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to be attached to the end of the estimate.
Painting & Varnishing	Original	20	1056 Sft	5/11	60				-do- & increased rates for labour & material.
	Revised	15	393 Sft	6/8	26		34		-do- & reduced quantities.
Site clearing	Original	21	L.S.		100				
	Revised	17	L.S.		95		7		-do-
Cement rendering	Original				nil				
	Revised	8	464 Sft	12/-	56	56			On account--of--change of design.
Coal taring	Original				nil				
	Revised	16	L.S.		30	30			-do-
Sewer drain	Original				nil				
	Revised	19	231 Lft	7/10/-	144	144			-do-
Lime masonry for retaining wall	Original				nil				
	Revised	20	189 Sft	52/3	88	88			-do-
Cement pillars masonry	Original				nil				
	Revised	21	9 Sft	136/-	12	12			-do-
Total					6370	1555			

COMPARATIVE STATEMENT-- (concluded).

NOTES.

$$(\mathbb{F})$$

Manual Form No. 69.

Page 44 of 44

UNITED PROVINCES.

DISTRICT.

DIVISION.

COMPARATIVE STATEMENT,

And, Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (F) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and financial returns should be quoted in the table of references, with any fresh references, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates to record in each case that they "will be the same as in the Original Estimates (No. ———) with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-ordered. Accompaniments to Revised Estimate, e. g., "and enumerated" on page 1 of the Revised Estimate along with any fresh proposals.

Extract from P. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801.

*Para. 8:—*Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 168.—A Revised Estimate must be submitted when the current estimate is likely to be accepted either from the interest of economy, or from any other whatever, except as mentioned in para. 70.

[illegible]

7. The FBI will receive reports from all relevant sources of the commission of a terrorist act, the perpetration of a terrorist offense or the possession of a terrorist weapon, and will take the appropriate action to prevent the commission of a terrorist act, the perpetration of a terrorist offense or the possession of a terrorist weapon. The FBI will also take the appropriate action to prevent the commission of a terrorist act, the perpetration of a terrorist offense or the possession of a terrorist weapon.

Original Estimate:

of the Revised Estimate

EX-658

Difference of

海狗油

Total expenditure: \$100.00

Net sales of service

EXPLANATION OF DIFFERENCES.

Page 153.

NOTE--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.

If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.

COMPARATIVE STATEMENT - (concluded).

NOTES.

37

¹¹ Manual Perm No. 60.

Page 10

[illegible]

1. In the United Provinces, this form is to take the place of *Cd. Form 119*, prescribed in the *Cd. rules* quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a Comparative Statement and Explanation of Differences, on the form (B) which will immediately precede the abstract on Form V or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The term should refer to phonological entities.

The original and all subsequent administrative and financial records should be grouped in a table of references, with any fresh forecasts, not quoted in previous management estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, new arguments, and references to be made in each case that they "will be the same as in the original" &c. (See p. 10) with the following exceptions: (which should be given in full detail.)

6. Papers belonging to a Christian Education and Temperance Society should be sold to the highest bidder and the proceeds should be used for the benefit of the Christian Education and Temperance Society.

Excerpt from P. H. D. Card

CHAPMAN, F. F. PAGES 197-200 501

Para. 12:—Any development of a project through necessity with a work in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Part 718 - A Reward Estimate must be submitted when the same incident must be dealt with, excepted either from the rules by being found to be false or from any case where not excepted as mentioned in part 719.

[illegible]

Page 801. - "It is expressly provided, when an individual is named in the commission of a crime, as to render the punishment of a felon, not otherwise punishable, the crime of a felon, with a full conviction, and in the case of a felon, only be given, when the crime is not a felony, of the (Grand Jurors)." -

UNITED PROVINCES.

Final Test Instructions

Second DIVISION

Public Health Dept. L.

COMPARATIVE STATEMENT

And Explanation of Differences between Helminths

No. and Revised Estimate No. _____

of the probable cost of Kutchaary BuzhSub-Station: Initials:

Train, Tel Hydro Electric Supply

[illegible]

Sub-heads of Work in which differences occur.	Serial No. of sub-heads	Quantity.	Rate.	Cash. Rs.	Excess. Rs.	Saving. Rs.
Brought forward					30772	Nil
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Total excess and saving					30772	NIL
No. of pages of report					30772	

1. In the United Provinces, this form is to take the place of Cdr. Form U3, prescribed in the Orders quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (K) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimates.

The original and all subsequent administrative and financial questions should be quoted in the table of references, with any fresh references, not quoted in previous sanctioned estimates.

5. It will generally suffice in drawing up details of fresh specifications, calculations, and drawings, and notes to record in each case that they will be the same as in the Original Estimates (Nos.) with the following exception: " (which should be given in full detail.)

6. Pages belonging to an Original Estimate and re-incorporated as part of a Revised Estimate should be clearly re-marked "As per request to Revised Estimate of _____" and numbered on page 1 of the Revised Estimate along with any fresh pages.

Excerpt from E. W. D. Code

CHAPTER VII. PAGES 781 TO 801.

Part 3. Any development of a proper thought process while a work is in progress, which is not fairly contingent on the proper execution of the work as then conducted, must be deferred by a supplementary estimate.

Page 118. A revised footnote to the estimate when the value of the model is likely to be exceeded is taken from the notes to the annual editions of *Statistical Canada*. Whatever is now mentioned in page 187.

[illegible][illegible]

UNITED PROVINCES.

Point To Distance.

St. Germain, DIVISION

C. COMPARATIVE STATEMENT.

And Explanation of Differences between Males

Nº. und Revident Fühunges No.

if the probable cost of **Self-Selection**

Expenditure.

United Hydro-Electric Supply

16-420

of the Lewis/Engel 37, 19

100-1074

131150240-4-0



Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost, Rs.	Excess, Rs.	Saving, Rs.	Serial No. of sub-heads in revised Estimate.	
Coolie Sheds	Original	...			nil				The necessity of the temporary buildings arose during construction of Hydro Electric Scheme & these structures were quite essential in the interest of work.
	Revised	...			2178	2178			
Petrol Cell	Original	...			nil				
	Revised	...			1529	1529			
Chowkdar shed	Original	...			nil				
	Revised	...			855	855			
Lorry shed	Original	...			nil				
	Revised	...			2017	2017			
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
	Original	...							
	Revised	...							
Total or carried over					2	6779			

NOTE—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.

COMPARATIVE STATEMENT--(concluded).

NOTES:

(E)

Manual Form No. 69.

Page _____

[illegible]

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (W) which will immediately precede the abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final sanctions should be quoted in the table of references, with any fresh references, *not quoted in previous sanctioned estimates.*

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and taken to record in each case that they "will be the same as in the Original Estimates (No. ———), with the following exceptions" (which should be given in full detail.)

6. Plans belonging to an Original Estimate and re-submitted as part of a Revised Estimate should be clearly re-endorsed "Accompaniments to Revised Estimate No." and enumerated on page 1 of the Revised Estimate along with any fresh plans.

Extract from P. W. D. Code.

CHAPTER VII, PARAS. 797 TO 801

Para. 82.—Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 198.—A Revised Estimate must be submitted when the actual expenditure is likely to be exceeded either from the rate being found insufficient or from any cause whatever, except as mentioned in par. 197.

Page 109. When Revised Estimates submitted in must be accompanied by a comparative statement (P.W.D. Form No. 119). It is the duty also of the Executive and the Superintending Engineer to watch carefully the progress of expenditure, and to see that a revised estimate is submitted directly to the Government when the Deputy Accountant, Executive, Public Works, will be responsible for reporting all excess in price or in quantities of work which are likely to cause the estimate to be exceeded.

Para. 30. - When express orders have been received following the destruction of a work article under the commission of a Federal employee, it is desirable to ascertain the cause of the accident in which the article was lost, and to give such an investigation precedence over other work.

UNITED PROVINCES.

Main Tal _____ DISTRICT.

2nd Div. Public Health Department

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of Temporary Build-
ings.

Main Hydro-Electric Scheme.

Original Estimate: 11.1

of the Bureau of Animals 6070 -

CLARK 3-27-71

Released by the FBI on 05-11-2014

[illegible]

COMPARATIVE STATEMENT - (concluded).

NOTES.

(7)

Manual Form No. 6a

Page _____

UNITED PROVINCES.

Haini Tal DISTRICT

Second. DIVISION.

Public Health Department,

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of Work Establish-
ment.

Great Tel Hydro-Electric

Scheme 1

Extract from F. W. D. Code.

CHAPTER VII, PARAS. 787 TO 801.

Para. 3. Any development of a project thought necessary while a work is in progress, which is not fairly contingent on the proper execution of the work as first sanctioned, must be covered by a supplementary estimate.

Para. 18.—A Revised Estimate must be submitted when the amount of expenditure is likely to be exceeded either from the money being found sufficient or from any other cause whatever, except as mentioned in par. 17.

June, 1905. When Walter R. Smith is informed of this he is surprised by a comparative statement (C. W. L. Form No. 149). It is the duty area of the Engineer and the Government Engineer to watch carefully the progress of excavation, and to make a daily estimate to be submitted directly and personally to the Engineer in Charge, and to the Chief Clerk. It is the responsibility of the Engineer, and of the Chief Clerk, to make the estimate to be submitted.

Part 3D—When extensive cover of wood in advanced stages of decay is observed on work areas, removal of the material by a Kestrel Machine Company, Inc. crew will be dealt with in a subsequent report in which details of the work done by the crew is given. A list of the work done is given below.

Journal of American Studies, 37 (2003), 1, 1-11
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http://journals.cambridge.org/9780521875866

of the German language. 1856

FLYNN: 2040

014409

05-1578

Sub-heads of Work in which differences occur.	Serial No. of sub heads	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.
	Brought forward				8640	
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Original ..						
Revised ..						
Total excesses and savings					8640	
Net result of saving					8640	

Sub-heads of Work in which differences occur.		Serial No. of sub heads.	Quantity.	Rate.	Cost, Rs.	Excess, Rs.	Saving, Rs.	Serial No. of sub-heads in revised estimate.
Machinery	Original	...	2 to 7		92000			
	Revised	...			174301	81301		
Six lighting points complete.	Original	...			nil			
	Revised	...			450	450		
Rising main	Original	...			38436			
	Revised	...			65062	26626		
Pumping station buildings	Original	...			nil			
	Revised	...			63685	63685		
Alterations to filter house.	Original	...			9000		9000	
	Revised	...			nil			
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
Total or carryovers					172002	9000		

Increased cost as well as rise in exchange rate.

Change of design.

Increased cost as well as rise in exchange rate.

Change of design.

On account of design of above.

Note—Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.

elaborations & additions to water supply. NOTES:

Manual Form No. 49.

Page

22119

DISTRICT

Second

DIVISION

Public Health Department,

COMPARATIVE STATEMENT.

And Explanation of Differences between Estimate

No. and Revised Estimate No. _____

of the probable cost of 437,000,000

alterations & additions to water supply.

Waini Tel Hydro-Electric supply.

Excerpt from R. W. D. Code.

CLASS. VI. PAGES 797 TO 801

Paragraph 6. Any development of a project thought necessary while a work plan program, which is not fairly contingent on the proper execution of the work as here mandated, must be covered by a separate monetary contract.

Para. 18 - A signed statement to be submitted when the applicant's name is likely to be associated with a report that may be found insufficient or from any other source, except as mentioned in para. 101.

Para. 10. When advised by a native informant it must have originated by a comparative and more (P. W. H. Form. c. 114). It is the chief site of the Kamote, and the Superintendent is required to watch carefully the progress of acquisition, and to be thus a living element in promoting directly the economic aims. The Deputy Commissioner at Pabla Wagon will be responsible for reporting all items in the acquisition of work which are likely to cause the natives to become discontented.

Page 804 - Was not seen after 1900 and
was reported by the government as a wolf which
ruled the distribution of a large number of
bushes, the wolf not by itself but in a
community with it which feeds on and
given when the forest is not a large forest
in the forest.

Approved Original: Bolinares 140430

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Phonetic 13410

11-2081084-31

Abstract

Total excess and saving

172052 900

Net mass of sample

107025

Sub-heads of Work in which differences occur.		Serial No. of sub-heads.	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.	Serial No. of sub-heads in revised estimate.
Contingencies	Original	...			92260			
	Revised	...			85982		6278	
Contingencies have been rated at 5% instead of @ 10%.								
S.M.'s fee	Original	...			121782			
	Revised	...			222148	100366		
On account of increased cost of revised estimate.								
Compensation for tree cutting	Original	...			3000			
	Revised	...			nil		3000	
This work has not to be done by this department.								
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
Note--Sub-heads of which the quantities, rates and amounts are identical in both estimates are not to be entered.								
If this page does not suffice, continue the explanation on a separate manuscript sheet in this form to face next page.								
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
	Original	...						
	Revised	...						
Total or carried over					100366	9278		

COMPARATIVE STATEMENT - (concluded).

NOTES:

{N}

Manual Form No. 1

Page _____

Sub-heads of Work in which difference occur.	Serial No. of sub heads	Quantity.	Rate.	Cost. Rs.	Excess. Rs.	Saving. Rs.
	Brought forward				100366	9278
Original ...						
Revised ...						
Original ...						
Revised						
Original ...						
Revised ...						
Original ...						
Revised ..						
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Revised ...						
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Original ...						
Revised ...						
Original ...						
Revised ...						
Original ...						
Revised ...						
Total excess and saving					100366	9278
Xeroxed and saved					91836	

1. In the United Provinces, this form is to take the place of Code Form 119, prescribed in the Code rules quoted below, which are no longer issued by the Government of India.

2. Revised Estimates will be prepared on the same form as Original Estimates, with the addition of a *Comparative Statement and Explanation of Differences*, on the form (F) which will immediately precede the Abstract on Form Y or Z.

3. The Revised Estimate should be complete in itself, and must not contain any of the documents except plans forming part of the Original Estimate.

4. The report should refer to the original estimate.

The original and all subsequent administrative and final actions should be quoted in the table of references, with any further sources, not quoted in previous search and citation of it.

5. It will generally suffice in drawing up details of fresh specifications, calculations, measurements, and rates for a year that they "will be the same as in the original Estimates (No. 100000) with the following exceptions" (which should be given in full detail).

6. Papers belonging to an Original Returnee and re-admitted, acquire a Revised Returnee should backhandedly re-narrate a "Acquaintance to Revised Returnee" on page 1 of the Revised Return along with any fresh paper.

Report Form 2, W. D. C. 100-100000

Chapter V. L. Pages 787 to 801.

Paragraph 4 - development of a proper thought necessary with the carrying program, which is not fairly contingent on the proper execution of the work as first mentioned, must be covered by a management policy.

Part 754 - A statement should be submitted when the same is a statement likely to be extracted either from the case, being found in evidence, or from any mass whatever, except as mentioned in part 751.

[illegible][illegible]

UNITED PROVINCES.

NAME AND DISTRICT

Second, H. H. Hunt, DIVISION

COMPARATIVE STATEMENT,

And Explanation of Differences between Estimate

No. and Revised Edition No.

of the probable cost of

Unit 1 Hydro electric

Uchenye

Journal of Legal Education 21:1-2

of the day, at 3:00 p.m. 1931.

LEONARD M. BLOOM

THESE

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Note by Sanitary Engineer, Naini Tal Hydro-Electric Scheme.

SEVERAL alternative schemes have been prepared for the utilization of the power stored in the lake and the neighbouring springs for purposes of lighting and pumping in Naini Tal. It is profitless to go over old ground and describe the different schemes in detail especially as the history of the various schemes is fully recorded by Mr. West in the report of his scheme of 1915, which I enclose for reference (without the drawings). It will however be interesting to mention what the different proposals were.

(1) Mr. Goument's scheme of 1908 to cost Rs. 1,40,000. This scheme was moderate indeed and was intended merely to supply electricity to Government House and some public buildings together with 3 miles of road lighting.

(2) Mr. Tufnell's scheme. This scheme was based on Mr. Goument's figures but was a bit more ambitious. It was to cost Rs. 1,84,000 but the supply of electricity was to be limited to Government House and certain large public buildings and 4 miles of road were to be lighted.

(3) Mr. Tufnell's revised scheme. This scheme provided for the harnessing of the Sipahi dhara, Krishnapur and Coolie dhara springs. Mr. Tufnell estimated the yield of these springs to be 185 gallons per minute whereas Mr. West subsequently estimated it at 560 gallons per minute. The scheme provided for 13 miles of street lighting (against 4 miles in the former estimate) together with 14½ miles of distribution mains for private lighting. The estimate amounted to Rs. 2,78,235.

(4) Mr. West's scheme of 1918 amounting to Rs. 4,40,399. This scheme was based on the assumption that Mr. Tufnell had not taken full advantage of the water power available in the springs and an attempt was made to calculate the maximum demand for electric current in Naini Tal. So far the schemes considered merely the more urgent demands without any reference to future requirements. Now Mr. West went rather carefully into the matter with Mr. Bell the Electrical Engineer to Government and compared the demands with those of Mussoorie in 1914-15. It is a fact that since that year the demands of Mussoorie have increased considerably and have thrown a brighter light on the situation. Also I fear Mr. West has over-estimated the yield of the springs from which he proposed to obtain his power. This seems to be due not to any fault of his but to the fact that no single gauging of a spring can give any reliable information. I personally checked the discharge of the springs with Mr. Hoey and his figure of 230 gallons per minute is correct (see page 6 of his report). The fact is that a single estimate of yield is not a safe datum to work on especially when irrigation is done from the springs—also actual yields vary from year to year and what is really required is a complete hydrograph of each spring extending over a period of at least ten years.

Again in order to harness the springs expensive storage and head works are necessary and I cannot think why the lake supply was not investigated more thoroughly in the

This was a serious omission and discounted its usefulness

H. M. WILMOTT.
9-10-1919.

This irrigation is of no account and could be stopped. But the fact remains that the discharge from the springs is variable from year to year.

H. M. WILMOTT.
9-10-1919.

first instance. It is certainly very tempting to tap springs which do not in any way affect the lake level but I think it is perfectly clear that the lake level will never fall uncomfortably below its normal low level in ordinary years, and that if a careful watch is kept on it, it will give no trouble even under abnormal circumstances - with this subject I will deal later.

Mr. West in his report has estimated that the consumption for private lighting per annum will be $\frac{300}{950} \times 108000$ units = 31,680 units. This he calculates on the Mussoorie figures of 1914-15 which, no doubt, were quite reasonable at that time, but it will be seen that Mr. Hoey's figure far exceeds this, being in fact 292,626 units (see page 37 of his estimate). I am inclined to think that this figure is somewhat over the mark, but I leave it as an estimate, feeling as I do, that he has under-estimated the load for cooking and heating and bazar lighting.

Again Mr. West allows for street lighting - 25 lights per mile against Mr. Hoey's 35.

Lastly, and I think this is a serious omission, Mr. West has not included the electrification of the water supply in his scheme.

I wish it to be distinctly understood that I am far from wishing to make little of Mr. West's scheme which, I think, has many excellent points, but I think that in the light of more recent experience it is necessary to revise it on larger lines.

In short, I do not think that the scheme is comprehensive enough. The yield of the springs from which he proposes to derive his power is very doubtful, the loads he calculates are based on Mussoorie figures, which are now, I believe, out of date, and lastly it is necessary to include power for pumping in the scheme.

I think the above note justifies the revision of the scheme which has been undertaken under the orders of the Chief Engineer. The revised estimate has been prepared by Mr. Hoey who has investigated the case very thoroughly in close consultation with Mr. Bell, the Electrical Engineer, and the representative of Messrs. Mather and Platt. The Mussoorie figures and loads have been closely compared and I am convinced that no pains have been spared to bring the scheme up-to-date in every respect and that every possible contingency has been considered. As far as can be seen at present I cannot believe that the scheme can be anything but a success and that it will meet all demands for the next twenty-five or thirty years.

I need not describe the scheme as it has already been so fully dealt with in Mr. Hoey's report but there are a few points which perhaps might be explained more fully.

It is proposed to utilise the lake water for the power and this is obviously the proper course to pursue because expensive storage reservoirs are avoided. I am certain that a certain amount of opposition to this course will be inevitable, because of the fear of the lake level falling dangerously low during the summer months if there is an exceptional drought.

I agree subject to this proviso.

H. M. WILLMOTT.
9-10-1919.

The cooking and heating loads are innovations but must be considered to a reasonable extent.

H. M. WILLMOTT
9-10-1919.

This was certainly a questionable expedient especially with pumps needing renewal at an early date.

H. M. WILLMOTT.
9-10-1919.

I agree.
H. M. WILLMOTT
9-10-1919.

While this is somewhat optimistic, I am satisfied that the proposals cannot be improved on in all respects, and that no material extensions should prove necessary for at least 15 years.

H. M. WILLMOTT
9-10-1919.

The Executive Engineer calculates that during the nine dry months, i.e., from 15th July to 15th October evaporation and leakage may account for 3.75 feet, because in 1915-16 a total fall of 3.8 feet was recorded although there had been a rainfall of 6.97 inches in the dry interval. He again quotes the figures of 1912-13 which gave a drop of 2.7 feet with a rainfall of 1.75 inches during the dry period. Obviously the 1915-16 figure is unreliable and was due to bad regulation. I do not anticipate a greater fall than 2.5 feet in the year from evaporation and leakage under the worst circumstances because I am convinced that a considerable quantity of water is wasted at present in flushing at the Talli Tal end of the lake and that the regulation at the sluices is nothing like efficient. I therefore do not anticipate a greater variation than—

Evaporation	...	...	2.5 feet.
Power purposes	..	...	3.4 ..

Total ... 5.9 or say 6 feet.

The extreme variation at present in very dry years seems to be 4.75 feet, i.e., we must look for a fall in extreme cases of 1.25 feet below the present lowest level. Now this will occur once in perhaps 20 years, and need not, therefore, be feared, especially as the present steam-driven plant for the water works is to be retained as a standby and can be put into commission at a moment's notice if the lake level is falling uncomfortably rapidly. I am proposing (later in this note) to do all the pumping between 6 a.m. and 6 p.m. and as the lake pumps which at present supply the Government House gardens with water will also be kept as a standby, it will be seen from the load schedule on page 44 of estimate that the whole electric plant can be shut down during those hours and the total daily expenditure of lake water can be reduced by half; i.e., assuming that towards the end of April it commenced to become apparent that owing to short winter rains the lake was dropping rapidly (take the example of the year 1902, page 56). The pumps would be started and kept going for say May and June—this would mean a saving of about 70,000 c. ft. per day, the conditions being severe, or $70,000 \times 62 \text{ days} = 4,340,000 \text{ c. ft.}$ which means a depth of 0.8 feet of the lake.

Now this would be an extreme case and even in such a case it can be seen that with judicious regulation the lake need not fall more than 6 inches below its present extreme level. At the same time I am of opinion that the crest of the outfall weir should be raised by 18 inches but this need not be done until it is seen by experience that such a course is necessary. It may of course happen that the diversity factor applied on pages 49 and 50 of the estimate is too low and the expenditure of water may be considerably higher than anticipated but this will take some years to ascertain and obviously there is no necessity to be in a hurry about the raising of the lake level but I would advise that a scheme be prepared for the raising of the crest of the weir, so that work may be ready to proceed, if necessary, at a moment's notice.

It is safe to say that this will not exceed 7 feet under the worst conditions provided the lake discharge operations be entrusted to one efficient officer.

H. M. WILLMOTT.
9-10-1919.

This must be done and it will have to be kept in working order.

H. M. WILLMOTT.
9-10-1919.

A minimum gauge must be fixed for April to avoid trouble from the insanitary forebushes and its putrid decomposing weeds.

H. M. WILLMOTT.
9-10-1919.

The regulation that matters is that of the various piped outlets primarily for the dhobi-ghats flushing of all kinds. The cart road demands must also be met and they are growing rapidly with the increase of motor transport.

H. M. WILLMOTT.
9-10-1919.

The lake raising up to 2 feet in maximum gauge will not be needed for five or six years and may then cost Rs. 30,000 if done thoroughly.

H. M. WILLMOTT.
9-10-1919.

I think enough has been said to show that the water level in the lake need never be any lower than at present.

The intake designed by Mr. Hoey is not to my liking. I quite appreciate the value of a long intake pipe in the lake, but this seems an unnecessary complication. The pipe will be difficult to lay and more difficult to repair. I recommend an ordinary intake with no pipe with the invert level at R.L. 6,344.0 as suggested by Mr. Hoey. This will be easily designed and a grating can be provided to prevent choking. There will be a watchman on the spot and the fear of choking can be reduced to a minimum. A revised design on cheaper lines will, therefore, have to be made. The site of the intake has been selected by me in consultation with Mr. Hoey and will stand as suggested in the project. I have no fault to find with the alignment of the power pipe line and agree with the specifications of joints and remarks regarding station buildings.

The tail race weir and liquid level recorder are necessary especially for the efficiency tests of the power units and as a check on the consumption of water. I have no remarks to make regarding the power plant and power station and sub-station equipment and the transmission and distribution lines but I have a good deal to say on the subject of water supply and the power provided for the pumps.

Mr. Hoey provides for a consumption of 15 gallons per head per day and has provided two motor driven three throw pumps delivering 68 g.p.m. against a head of 1152 feet for the high level area—(see page 63 of estimate.) These he proposes to work for 20.2 hours. Now from his anticipated load line on page 46 it will be seen that between the hours of 7 and 10 at night his load is pretty high and he, therefore, has no time for extra pumping should it ever be required; i.e., he is tied to 15 gallons per head and has no means of increasing it by pumping more than 21 hours although he has plenty of storage capacity. The population on the high level mains is purely European and when a water carried sewage system is provided the flushing will take 5 gallons per head, if not more and they will be reduced to a 10 gallon supply for other purposes. This I maintain is absolutely inadequate.

I can see from Mr. Hoey's statement on page 63 that he has tried hard to make his motors both for the high and low levels interchangeable but I fear he has done so at the expense of safety. I do not approve of the small motor for the high level pumps because the efficiency of the plunger pump of 70 per cent. cannot be relied on when the valves, valve seats and the plungers wear—it will be safer to assume an efficiency of 80 per cent. Again it is unsafe to assume a loss of efficiency of 4 per cent. in gearing.

The loss in nitron gear is	5 per cent.
Ditto helical gear is	10 "
Ditto spur pinion gear is	15 "
Ditto belts (when new) is	10 "

Therefore 90 per cent. efficiency in gearing is unusual and I do not agree to anything more than 90 per cent. for estimating purposes. As designed there will be a heavy slip

I accept this subject to examination of the detailed design.

H. M. WILLMOTT.
9-10-1919.

A daily inspection will suffice.

H. M. WILLMOTT.
9-10-1919.

I have indicated to Mr. Hoey some changes on the lay-out of the office and store room and modifications of the power house design.

H. M. WILLMOTT.
9-10-1919.

This is certainly excessive involving more than two ordinary shifts and no expansion.

H. M. WILLMOTT.
9-10-1919.

Fifteen gallons per head for the hot weather as a mean for the population of 22,000 is likely to suffice for many years inclusive of a fair allowance for gardens and flushing.

H. M. WILLMOTT.
9-10-1919.

This is most desirable at
the outset.
H. M. WILLMOTT.
9-10-1919.

as the pumps get old and the supply will be deficient to a certainty. I, therefore, propose to pump the supply of 15 gallons per head in 12 hours instead of 20 (thus providing a possible extension of pumping hours, if necessary) and to provide a pump delivering 120 g.p.m. instead of 68 g.p.m. This means a motor of 94 H. P. or 80 K. W. This means that the estimate for water supply alterations on page 145 will be increased.

Item (2) Pumps

	Rs.
Two motor driven three throw pumps head 1300 feet 120 g.p.m. erected ...	27,000
Instead of Rs. 17,000 as estimated on an excess of ...	10,000
Add for a new rising main to Cheena ...	18,421
Also for lifting existing 4 inches Cheena main and relaying it to Ayarpata ...	1,217
Total ...	29,638

I would like to say that it is doubtful whether it would be wise to instal multi stage centrifugal pumps for the intermediate level reservoir.

The Simla municipality should be consulted alone because I understand that they have had trouble with theirs. If it is decided that centrifugal pumps are unreliable displacement pumps must be installed for this level.

A. C. VERRIERES

Centrifugals may however be installed for the low level which has a lift of only 260.

A. C. VERRIERES

I prefer the well tried displacement pumps for the intermediate level but foresee no serious objection to centrifugals of the modern type.

H. M. WILLMOTT.
9-10-1919.

This must be expected in the future in dry years.
H. M. WILLMOTT.
9-10-1919.

Doubtless. But this is for the dim future.
H. M. WILLMOTT.
9-10-1919.

Now as regards the intermediate and low level zones I appreciate Mr. Hoey's very clever arrangement of pumps and motors all of which can be arranged to work either in series or in parallel and to pump into either the intermediate or low level reservoirs but when all is said and done he provides six pumps and three motors and thus gives only 50 per cent. standby. He has arranged this with the laudable intention of saving money but he does not appreciate that by providing four pumps and four motors he can give 100 per cent. standby at an extra cost including extra motor and switchgear of only Rs. 3,000. I feel almost sorry to upset his very ingenious arrangements but I think it best to do so in the interests of the scheme.

The total excess being Rs. 29,638 plus Rs. 3,000
=Rs. 32,638

Or adding fees, etc. Rs. 40,210 (see page)

The storage at each level is more than is absolutely necessary and this makes the scheme doubly certain of success.

If the springs fail to give the necessary supply they can always be supplemented by a chlorinated supply from the lake and it is unnecessary, therefore, to bother about the spring supply.

There is very little more to be said about the scheme which is an excellent one in every respect but there remains the question regarding the harnessing of the springs proposed by Mr. West.

If in later years the power is found insufficient these springs can easily be harnessed and will form a valuable supplement to the lake supply. The flow in the Balla ravine can also be utilized. Extra pipe lines and pelton wheels will however be necessary and the matter may be allowed to rest for the present.

I am convinced, as I have said before, that the regulation of the sluices at the Tall Tal end of the lake, is not done efficiently and that a great deal of waste occurs in the flushing of the street drains. It is essential, therefore, that the regulation should be taken over by the resident Electrical Engineer. This is, to my mind, a very important point.

With these remarks I pass the scheme.

The 8th September, 1919.

A. C. VERRIERES, C.I.E.,
*Sanitary Engineer to Government,
United Provinces.*

It is not clear what specification is assumed for the various structures. The local divisional specification should be adopted with any necessary modifications to suit special needs.

H. M. WILLMOTT.

The 9th October, 1919.

I concur entirely, i.e., by the future municipal engineer who must be an all round man with special electrical training.

H. M. WILLMOTT.
2-10-1919.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

PARTICULARS OF PROJECT.

System, Alternating, Three Phase, Fifty Cycles.
 Power factor assumed 0.8.
 High Tension Transmission at 3,300 volts.
 Distribution at 380 volts.
 Average length of Transmission 2.2 miles.
 Total length of Distribution Lines 15.34 miles.
 Maximum load anticipated in near future 300 K. W.
 Number of sets, three, each of 150 K. W. with self-contained exciters 750
 v. p. m., 3,300 volts, and direct coupled to Pelton wheels 272 B. H. P. with governors,
 combined jet deflectors and needle valves.

Effective head of supply 1,400 feet with 200 ft. p. m. for peak load—

Units delivered per annum	...	...	7,04,436
Capital cost of Electric supply	...	Rs.	9,76,622
Running Expenses per annum	...	Rs.	1,12,174
Estimated Revenue per annum	...	Rs.	1,83,311
Cost per unit delivered	...	...	2.55 annas
Capital cost of Water Supply Improvements	...	Rs.	1,32,807
Population served	...	...	22,000
Supply 15 gallons per head per day—	...	...	...
Running Expenses per annum	...	Rs.	60,240
Cost per 1,000 gallons pumped	...	...	13.9 annas

G. McC. HOEY.

Executive Engineer, 1st Sanitary Division,

Saharanpur.

The 29th July, 1919.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

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G. McC. HOEY,

*Executive Engineer, 1st Sanitary Division,**Saharanpur.**The 23rd July, 1919.*

NAINI TAL HYDRO-ELECTRIC SUPPLY.

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NAINI TAL HYDRO-ELECTRIC SUPPLY.

REPORT.

Necessity of Revision.

The former estimate has been found inadequate in three important respects, viz. —

- (a) Power Allowances.
- (b) Supply of Spring Water.
- (c) Rates for Work.

In the first place to ascertain what kind of a load line we are to expect, a count has been taken of all likely consumers inside Municipal limits, a schedule of requirements has been drawn out both for the summer and winter loads and the resulting load lines plotted.

The estimated load lines have been designed to cover the severest demands likely to occur, and the average output will in all probability not reach two-thirds the consumption shown.

Power Requirements.

2. The calculated loads include a liberal allowance for lighting and water supply, pumping and certain provision is made for cooking and heating units.

During a year of drought the lighting and pumping load alone may tax the available water resources to their limits.

During normal years, however, a certain amount of power will be available for heating and cooking and provided it is clearly understood that such a supply may have to be cut off in a dry season, no harm can happen by encouraging the demand.

The calculated maximum summer load exhibits a demand of 2,927 units per day delivered at consumers terminals, a peak of 262 K. W. and an average load throughout the day of 122 K. W.

The winter load line, which like the summer load, has been calculated to cover severest conditions of demand, will require 1,525 units per day delivered, and a peak of 112 K. W. throughout the day.

3. The calculated load is a reasonable expectation of what the demand may develop to in the course of four or five years and the power of the generating sets is based on it.

Allowing for transformer, transmission and distribution losses, a peak load of 262 K. W. at consumers terminals will not fall far short of 300 K. W. at the power station bus bars.

An analogous Mussoorie load.

The Mussoorie load line of maximum severity, a plotting of which is attached below, shows a peak of 330 K. W. measured at generator terminals for lighting alone. This load line is analogous to the load to be met in Naini Tal. The 300 K. W. peak allowed for Naini Tal seems therefore to be a reasonable anticipation, for there are 450 consumers in Mussoorie (including schools, colleges, hospitals and hotels) against 375 at Naini Tal, the latter being more compactly placed and the average transmission shorter.

A peak load of 110 K. W., it should be stated, was anticipated in the former estimate.

A load of 300 K. W. can be most efficiently met by three sets each capable of 150 K. W. at normal full load. Usually two sets will work together, the third acting as usually stand-by.

4. The power pipe line must be capable of serving two such sets running together at normal full load, and such a pipe line, it will be seen from the calculations below, is capable of serving one set at a time under test at 25 per cent. or even greater overload.

5. To enable as clear as possible an estimate of the requirements in water to be framed, the efficiency curves of a 150 K. W. alternator and a suitable Pelton wheel have been plotted and the resultant over all efficiency for all variations in load obtained.

Requirements in Water
for Power purposes.

Transformer and line losses have been allowed at a uniform rate of 10 per cent. to save complications, which approximation will not cause appreciable error in the result.

From this curve the cubic feet of water required per minute for a given head and a given load can be calculated with tolerable accuracy.

6. If the supply from the springs is adopted as the main source, the working head on the Pelton wheels will be about 950 feet allowing for losses in the pipe line and jets.

To meet the daily requirements during severest demand about 206,340 cubic feet are required, at a head of 950 feet.

The flow varying from 205 cubic feet per minute at maximum to 67 cubic feet per minute at minimum load and showing an average throughout the 24 hours of 152 cubic feet per minute.

7. If the supply of 560 g. p. m. ($\approx 80 \cdot 6$ cubic feet p. m.) as stated in the former estimate was available from the springs as a minimum, we should be at short of 62·4 cubic feet per minute on an average.

Adequacy of Spring supply.

Writer had occasion to inspect the springs during creek gauging operations several times between 20th May, 1919 and 1st June, 1919, after a fairly dry season.

The supply from the springs has in some measure been overestimated and it will be unsafe to reckon on more than the following supply which has been gauged with kerosene oil tins and a stop watch:—

Sapari Dhara	...	50 g. p. m.
Mota Pani	...	10 "
Chokri Dhara	...	320 "
Total	...	380 g. p. m.
		$\approx 40 \cdot 4$ c. ft. per minute.

This flow of itself does not justify the springs being made the basis of the power supply to Naini Tal and Roorkee must be had to the lake.

Other reasons for discarding the springs as the fundamental supply.

8. Besides their inadequacy there are other reasons why the springs should not be relied upon as the main supply for power.

The Coolie Dhara spring from which most of the supply will be derived is situated on the face of a steep and disintegrated hillside; very costly revetment masonry will be required to support the pipe line and even with this it may not be possible to avoid break-down in slips.

Again if the springs are to be of use for any but small loads at the power station, costly storage arrangements will be necessary at the headworks.

A considerable portion of the Sepahi Dhara water is taken up for irrigation and a flour mill and compensation of no negligible amount will have to be paid if this spring is taken up for power supply.

Further-more in dealing with the lake as a source we have fairly reliable data in rainfall and run-off, on which to base our calculations.

Such does not exist in the case of the springs, the discharge of which may vary without assignable reason or may be affected by earth tremors reducing the flow, or causing a change of position of the springs.

9. For these reasons this project has been drawn out with the lake supply as basis.

It is possible that, at a future stage in the development of the electric supply, these springs may be found valuable to supplement the lake supply, so also might the flow in the Ballia ravine, roughly estimated at between three and four cusecs with an available head of 500 feet.

If efficiency is to receive attention separate Pelton wheels will be required for the several heads and flows.

No attempt is made in this project to combine the spring supply with the lake supply, for double-purpose pipe lines and wheels are more likely to lose than to gain in efficiency.

In order that reliable records of the springs may be available in future years when the demand may have developed beyond the capacity available in the lake, steps should now be taken to provide permanent masonry penstocks, weirs and automatic flow recorders.

The cost of this work will not be great and the information gained will be most valuable when the time comes for expansion.

A similar arrangement should also be provided at about contour R. L. 5,200 in the Ballia ravine, which even in a season of severe drought will apparently yield 200 K. W. as a minimum.

No allowance is made in this estimate for such work.

It is a matter for regret that such hydrographs are not available, for had they existed it is unlikely that the springs would ever have been proposed as a basis for the supply.

10. For the lake supply 2,500 feet extra of power pipe line will be required and a static head of about 460 feet extra is available.

Lake supply adopted as basis.

Possible supplementary supplies.

Necessity for recording Hydrographs of Springs.

Lake supply.

The calculations given below show that the total effective head from the lake will be 1,400 feet against 950 from the springs, the quantity of water required from the latter can therefore be reduced in the ratio 950/1400 in the case of the lake supply. The pressure mains need only be designed to allow of a flow of 291 c.f.t. p. m. instead of 295 c.f.t. p. m.

Two 10-inch mains will pass this supply (1,255 g. p. m.) at safe velocity. The total quantity of water required per day of severest summer demand will be 140,100 c.f.t. instead of 206,340 c.f.t. The supply per day of lowest winter load is calculated to be 53,700 c.f.t.

11. An examination of all the rainfall records available shows that we may safely count on three months of the year when the rainfall and spring supply will much more than balance the power requirements.

Storage required in lake.

Also an inspection of these records shows that the yearly discharge over the lake weir greatly exceeds the total annual requirements for power purposes, 55 million cubic feet being the minimum total discharge recorded (1,894).

Let us assume that the three months period, say from 15th July to the 15th October, will even in the driest years require no storage; water for power during the remaining period of the year will require either complete or partial storage according to the rainfall.

Reckoning the period November 1st till March 31st as under "winter" load conditions and the remainder of the year as under "summer" load, we obtain a period of nine months during which time, in abnormally dry years no addition to the lake may take place from rainfall and for which period therefore, a sufficient quantity of water must be stored in the lake.

12. Calculations given below show that about 18 million cubic feet of water will be required to tide the electric supply over this period of nine months.

Requirements for Power, eighteen million cubic feet per annum.

The records show that during the last twenty-three seasons on one or two occasions no appreciable addition took place during this period by rainfall to the lake (e. g. 1912-13 and 1902-3).

To guard against such a contingency in the future a storage of 18 million cubic feet must be provided.

The area of lake surface at about R. L. 6,350.0 is 5.25 million square feet, a depth of 3.44 feet will therefore be required.

13. To examine the relations between the fall in lake level during the winter and dry season and the rainfall over this interval, records have been tabulated shewing the dates immediately after end of rains when the sluices were closed and when the lake levels rose to a maximum, and the dates in the following hot weather when the lake levels had fallen to a minimum.

Allowances for leakage and evaporation.

The rainfall records over this period have also been tabulated.

Inspection of this table shows that no fixed relation can be established between the drop in lake levels and the rainfall.

It is true that the minimum recorded fall in lake levels occurred in the season 1906-7, and amounted to 1.30 feet with the maximum recorded rainfall 29.68 inches.

The minimum recorded rainfall does not however synchronise with the greatest fall in lake levels, vide season 1912-13 when the rainfall was 1.75 inches and the fall in lake 2.70 feet.

The maximum recorded fall in lake levels took place in 1915-16 and was 3.8 feet with a rainfall in the interval of 6.97 inches.

14. The irregular falls in lake surface cannot be explained by percolation and evaporation losses which do not vary much from season to season.

The irregular behaviour of surface levels is in all probability due to the draw off at Talli Tal, for flushing and other purposes and the manner in which the sluices are staunched.

The several outlet sluice valves there are apparently opened and shut at the taste and fancy of the jamadars in charge. On several occasions writer has noticed excessive quantities of water being used for flushing drains.

It will be an important duty of the Electric Engineer to see that no avoidable waste takes place from the lake.

15. If we accept the season 1912-13 as the severest over likely to occur a fall of 2.7 feet in 199 days or 0.135 inches per day is the greatest rate of fall to be anticipated.

An allowance to cover leakage and evaporation of 3.75 equivalent to over nine months at above rate would appear sufficient.

Add to this the 3.4 feet of storage required for power purposes and we obtain a total maximum variation in lake levels of 7.15 feet which might be encountered in a year of exceptional drought.

16. The lake levels have on occasion fallen as low as 1.0 feet and weir sill level is 3.75 on the gauge, so that a fluctuation of 5.75 feet takes place under present circumstances.

A further 2.4 feet scope must be arranged for.

A further 2 feet or 2' 6" is possible by remodelling the weir at Talli Tal and rebuilding the Post Office and station staff office there as well as raising parts of the roads round the lake. This will add appreciably to the cost of the scheme.

To initiate the supply, however, it is proposed to lay the intake from lake at such a level that the maximum variation in lake level will be available under existing sill level (i. e. 3.75 of lake gauge or R. L. 6353.66).

The invert of intake will be laid at R. L. 6344.0.

In subsequent years when the supply has become remunerative and extensions found necessary the question of raising the lake levels will doubtless come under discussion and be decided on its merits as an alternative to harnessing the springs.

Variation in level of lake probable in dry years, 3.75 feet.

Maximum anticipated variation in lake levels on 7.15 feet.

The whole supply of eighteen million cubic feet per annum will not be immediately required as it may be five or six years before the demand develops to the degree anticipated in calculations of demand.

17. To prevent the possible choking of intake by weeds washed up from lake bottom the vicinity of the weir will be avoided for the site of intake.

A suitable site has been chosen at a point a little north of the Patwadunga inlet chamber on the South Mall.

A detritus pit and screening chamber will be built close to the South Mall as shown on plans attached herewith.

18. From the catch-pit chamber the pipes will be carried in deep cutting along the main bazar road for a few chains in a uniform grade and below this will be laid with 36 inches covering under road level past the police station and the Rohilkhand and Kumaun Railway Office compound, across the cart-road and along the bridle path, then through the Gurkha Barracks compound, across the zigzags of the bridle path on to the Sipahi Dhara site.

From this point the alignment chosen in the former project will be adhered to, as far as the proposed site for the power stations.

The total length of power pipe line required has been measured as 6,800 feet.

Cramps to prevent creep and thrust blocks have been provided whenever necessary and a suitable number of expansion joints have been provided at the required intervals.

The "Albion" patent joints used on the Mussoorie water supply pipe lines have given some little trouble by weakness at the shoulders of the flanges.

It is proposed to use the "Vulcan" patent joints in this work. This joint is virtually a spigot and socket joint, lead caulked, with split ring flanges bolted over it, bearing on the packing and on the socket upset.

Expansion joints are arranged by the insertion of a plain sleeve pipe with double socketed pipes.

19. Both 10-inch pipes will deliver into a 15 inch steel pressure main laid parallel to the power station building through angle branches securely clamped to specially designed thrust blocks.

From the 15 inch main three 10 inch pipes will lead sluice valves fitted with bye-passes to the Pelton wheel jets.

For hand governing purposes special 10-inch valves off through will also be provided inside the power station in case of emergency.

A scour pipe with valve and an automatic pressure relief valve have been provided with the necessary discharge channel.

A suitable number of air valves have been provided on the Power Pipe Lines, not for the purpose of obviating air locks (for the Pipe Line will be laid without crests or dips) but as air reliefs during filling operations.

Position of Intake.

Alignment of power pipe line.

Power pipe line joints.

Power pipe line details.

Hatch boxes will not be provided as these have proved a source of weakness at Mussoorie.

If scraping should ever be found necessary the sleeve pipe expansion joints can easily be removed.

Spare pieces for all the more important cast steel specials will be provided as this is essential for continuity of supply.

Power station buildings.

20. The power station building will occupy the same site as chosen in the former proposals.

The site has been inspected both by the Sanitary Engineer and the Superintending Engineer, 2nd Circle, and as far as it is possible to judge is not in any danger from land slips or flooding.

A short length of irrigation gul will have to be dismantled and diverted and some revetment walling will be required. A suitable amount has been allowed in this estimate for land compensation.

The width of the station floor will be increased from 25 feet to 30 feet as the former width is too small to allow of a unit being dismantled with ease. The Mussoorie power station floor is 30 feet wide and the station building proposed in this estimate is substantially the same in details.

The tail race channel will be provided with a weir and approach channel with a liquid level recorder so that a continuous record may be kept of the water used.

The workshop, store and office will be situated at the south end of the building while extension towards the north will be possible without interference with the existing plant. The staff quarters, Inspection Bungalow and outhouses are identical with those proposed in the former estimate.

Power station equipment.

21. As before stated three 150 K.W. sets will be provided with direct coupled Pelton wheel and oil pressure governors. The Pelton wheels will be chosen mainly on a score of efficiency as economy in water is of importance.

To develop the full power of the generators at 25 per cent overload wheels of 272 B.H.P. will be required, for which a flow of about 130 c.f.s. per minute per set will be necessary. The governors will actuate jet deflectors with combined slow motion needle valves as such an arrangement is necessary if sensitive governing is to go hand in hand with economy in water and for avoidance of pressure surges in the power mains.

22. The alternators will be of the three phase type, fifty periods 3,300 volts, with self-contained exciters suitable for direct coupling to the Pelton wheels described above.

The alternators are specified to be suitable for the load with a power factor of 0.8, for this is a suitable allowance taking the nature of the load into consideration.

The switch board will consist of three generator panels, one station auxiliary panel, one feeder panel with auto-trip gear, one spare panel, and one Tirrel Regulator panel.

The Tirrel Regulator is essential if voltage fluctuations and consequent flickering of lights is to be avoided.

The connections from generators and exciters will be water proof leaded and armoured cable laid in special cable trenches to the switch board gallery, between the switches and the overhead line all connections will be of bare copper of sufficient gauge for rigidity, secured on porcelain insulators as far as possible.

The station will be lighted by ten 150 C. P. lamps, four of which will be on the exciter circuit and the remainder on the auxiliary transformer circuit.

The out-take for the overhead transmission will be from the tower over switch gallery.

High tension transmission.
3,300 volts.

The necessary Isenthal lightning arrestors with earth connections will be housed in the tower over switch gallery.

An alternative out-take for a second line (which is not included in these proposals) would be through the gable of Power Station Building.

23. A single H. T. transmission line is provided in this estimate on the same alignment chosen for the former project. A second line on an alternative alignment might be found advisable at some future date. Such has not been included in this estimate mainly on a score of cost.

Transmission pressure will be at 3,300 volts to the three sub-stations at the positions chosen in the former project.

The sub-station buildings will each consist of two inlet and outlet towers 8' x 8' capable of housing Isenthal Arrestors, one transformer chamber 14' x 12' and a chaukidar's hut 12' x 10'.

Sub-stations and equipment.

Westinghouse oil cooled transformers have been specified.

Telephone lines connecting up the various sub-stations with the Power House and the Electric Engineer's bungalow are essential, and as these will be constructed by the Telegraph Department an allowance only for the rest of connections is made in the running expenses.

24. The L. T. Distribution will be at a pressure of 330 volts between phases, i.e., 231 volts between a phase and neutral.

Distribution 330 volts.

The wires will be carried vertically one above the others.

Where the H. T. transmission is along a route of distribution both systems will be carried on the same poles to save in cost, but the equilateral spacing of the H. T. wires will be preserved everywhere.

Over both H. T. and L. T. lines an earthed wire will be carried for lightning protection, which will be clipped on to the pole caps.

Mannesmann steel tubular poles or Hamilton built up poles will be used whichever prove the cheaper.

Adequate allowance has been made for guying and strutting.

Drawings are attached showing the arrangements proposed.

Allowance has been made for staddle guarding wherever telegraph or telephone lines are crossed and also at important road crossings on the H. T. lines.

The smallest section of copper used is S. W. G. no. 6.

Calculations are attached of the weight of copper required, the sections being designed to admit of maximum current flow within the legal 5 per cent. voltage drop.

An allowance of Rs. 3,000 has been made for compensation for tree cutting. Experience in Dehra Dun shows that such an amount may be required.

Capital required Rs. 9,76,622.

25. The total capital cost of the work is estimated at present rates to amount to Rs. 9,76,622 including fees and contingencies.

The rates allowed in this estimate are intended to cover present conditions and are as accurate as it is possible to make them.

The prices of manufactured material are as yet by no means steady and a tendency to rise is noticed owing to increasing demand in Europe. It is thought that the contingencies item allowed at 10 per cent. in this estimate will cover all unforeseen items and possible rises in rates.

In estimates of this sort where a very heavy percentage of the running costs consists of sinking fund and interest on the capital cost it is a matter of prime importance not to underestimate the capital required.

If the supply is to become self-supporting and at an early date no part of the work can be left out with a view to reducing the capital cost. The governing item in this estimate is the power pipe line, and the generating and transmission plant provided is all required to develop the full load, none of it can be omitted if the anticipated demand is to be met or the estimated revenue attained.

Running expenses
Rs. 1,12,174 per annum.

26. An estimate of running expenses under heads of sinking fund and interest, staff, material and repairs charges has been drawn up and will amount to about Rs. 1,12,174 per annum.

One Electric Engineer on Rs. 800 per mensem will be capable of taking charge of the supply.

Conveyance allowance at Rs. 50 per mensem and house allowance at Rs. 100 per mensem have also been provided for him in the staff charges.

The Electric Engineer will also in the ordinary course of his duties take charge of the Water Supply and an allowance of Rs. 100 per mensem for this has been made in the running costs of the Water Supply.

As the success of the supply will in no small measure depend on the Engineer in charge an adequate salary must not be grudged a suitable man.

The suggested pay is not fixed at a minimum but should a suitable man be available at a lower rate there may be a saving on this item.

Yearly demand over
700,000 units delivered.

It is estimated that over 700,000 units will be generated per annum when the supply is developed and the cost per unit inclusive of all charges works out to 2.55 annas.

Revenue attainable

27. Charging pumping units and public lighting units at 3 annas each, i.e., slightly above cost price, private consumption at 6 annas per unit and a small private demand for heating and cooking at 2 annas per unit, a revenue of over Rs. 1,80,000 will be attainable with the supply fully

developed. Heating and cooking units are charged at 2 annas which is less than cost price, to enable the supply to compete with wood and charcoal.

The demand is purposely fixed low as it may not be possible to meet it in years of drought.

It should be noted that as the lighting and pumping charges will merely be book transfers the supply is dependent on private consumption for any profit.

The cost to the Board for public lighting will amount to about Rs. 18,430 per annum and a sum of Rs. 40,650 has been debited to the running expenses of Water Supply for pumping units.

It will not be difficult to obtain a revenue of Rs. 1,10,000 for private consumption as over 2,02,000 units per annum will be required at a moderate estimate when the supply is fully developed.

Rupees 1,40,028 was the income obtained for lighting by the Mussoorie Board in 1918-19.

About 2,850 tins of kerosine oil per mensem is the present consumption for Naini Tal. The population, therefore, pay about Rs. 90,000 for the present indifferent lighting, private and public.

Present consumption of kerosine oil.

28. With the supply fully developed there should be little difficulty in paying all charges and showing an annual profit of over Rs. 50,000 as far as the Electric Supply is concerned.

WATER SUPPLY ALTERATIONS AND EXTENSIONS.

29. For purposes of estimating the capital and running costs the Water Supply arrangements will be treated separately.

In view of the drainage works contemplated and the inadequacy of the present water supply an allowance of fifteen gallons per head of the summer population (23,000) will be made.

Supply allowed: Fifteen gallons per head per day.

This supply is about as much as the present springs will afford in dry seasons and any further increase would involve the use of chlorinated water pumped from the lake.

It is not anticipated that such a course will be necessary in the immediate future for the present supply only amount to five gallons per head of the population.

30. To save in power the area of supply has been divided into three zones, with populations, in summer of 5,500, 6,500, and 10,000; and pumping heads of 1,152 ft., 465 ft. and 260 ft. respectively.

Arrangement of zones.

The most efficient method of serving three zones will be by means of a high lift three throw plunger pump for the high zone, and centrifugal pumps for the intermediate and low zones. As the lift to the intermediate zone is practically double that to the low zone, two centrifugal pumps suitable for the low zone when run in series will serve the intermediate zone.

To benefit in full by such an arrangement the hours of pumping will be so adjusted that the power required for pumping to each zone is the same: the same size of motor can be used for all the sets.

Arrangement of pumps.

31. Two sets of motor driven plunger pumps for the high zone, and three sets of motors with multi-stage centrifugal pumps, one on each end of the motor, and an arrangement of valves so that the pumps in each set can either be used in series or parallel.

This allows of 100 per cent. standby power for the high zone and 50 per cent. standby power for the intermediate and low zones.

It is not proposed to dismantle or discard the existing steam plant which would bring in little return if sold, but the present plant will be kept for emergency use at any rate until the electric supply has been thoroughly tested and proven. So also will the steam pumps at the lake and the chlorinating plant be preserved for use in emergency.

32. Motors absorbing about 35 K. W. will be required and as the size is small compared with that of the generating sets induction type motors have been proposed. Allowance has also been made for the necessary transformer and switch gear and the disused filter house will be converted into a pumping station.

Alterations to existing mains.

Additions and alterations will also be required to the existing rising mains to enable a supply to be pumped simultaneously to each of the three zones of supply.

To connect up the intermediate tanks at Cheena and Ayarpatta 844 and 420 yards respectively of 5 inch main will be required.

33. The low zone pilgrim tank is at present connected to the pumps by a 5 inch main which must be replaced by a 6 inch main if the anticipated 15 gallons per head is to be delivered as proposed.

This 5-inch main 260 yards in length will be lifted and relaid as part of the connections to the intermediate tanks.

It is not proposed to add any further storage capacity to the existing tanks as these in conjunction with the new rate of supply will be quite adequate for all demands in the immediate future.

Capital required Rs.
1,32,807.

34. The total estimated cost of the water supply alterations and additions will amount to Rs. 1,32,807 at present rates inclusive of contingencies at 10 per cent. and fees for preparation and construction.

Running expenses Rs.
60,240 per annum.

The running expenses are estimated at Rs. 60,240 per annum including sinking fund and interest, staff, power materials and repairs charges.

Should the water supply amount to 15 gallons per head of the population the cost will be about 13.9 annas per thousand gallons.

35. The present water supply to Naint Tal amounts to less than five gallons per head and the cost to Rs. 1.61 per thousand gallons.

The water supply to Mussoorie amounts to 14.3 gallons per head per day and costs Rs. 1.03 per thousand gallons.

In this connection it should be remembered that the Municipal Board at present pay Rs. 23,014 per annum as sinking fund and interest on former loans and if this is

added to the total running expenses of the new arrangements the cost per thousand gallons will amount to Rs. 1.2 at a consumption of 15 gallons per head.

36. As the supply will take three or four years to develop into a self-supporting concern, all income during this period being swallowed up in meeting the running expenses some further allowance must be made over the capital cost estimated to meet the losses of first and second year.

A sum equivalent to one year's running expenses would be sufficient.

The total capital then to be found for the project would be :—

	Rs.
Electric Supply	9,76,622
Water Supply	1,32,807
One year's running costs	1,72,414
Total	12,81,843

Proposals for financing the supply.

37. The cost of current is high relatively speaking and this is in part due to the high prices now ruling but mostly because of the small winter load.

Possibility of winter industrial load.

A keen Engineer will overcome this by encouraging industrial load during the slack season.

It will be economy during this period to sell current at 2 annas or even one anna per unit to encourage consumption for all such extra units sold help to increase the revenue.

There should be scope in Naini Tal for small saw mills, stone crushers, lime dis-integrators and heating purposes over and above the allowances estimated.

38. On the principle that Municipal Boards who help themselves are also worthy of help from Government, a grant of half the capital required might be given provided the Board agree to raise the other half.

Grounds for giving a grant towards the capital required.

Such help would also be justified as specially difficult circumstances exist at Naini Tal where the supply is dependent for success on the summer load; also because the summer headquarters are at Naini Tal. Government will benefit much by the supply.

39. A grant of half the capital required would have considerable effect on the running expenses which consist mainly of sinking fund and interest charges at 8.72 per cent. on the capital.

This is a very heavy charge and is due to the short term of the loan.

The life of the greater part of the plant and buildings is much more than twenty years and corporations in the British Isles are never expected to pay sinking fund at such heavy rates. A normal period for such supplies would be about 35 to 40 years.

Effect of a grant of half
the capital required.

40. If a grant of half the capital required (Rs. 5,54,715) is made the following reduced figures for running costs would be expected :—

	Electric supply. Rs.	Water supply. Rs.
Sinking fund and interest ...	42,571	5,789
Staff ...	18,588	4,992
Materials ...	1,588	750
Repairs ...	6,656	2,270
Power ...	...	25,187
Rent ...	200	...
Total ...	69,603	38,988

The cost of power would be 1.58 annas per unit and the cost of water 8.96 annas per thousand gallons. Inclusive of present sinking fund and interest charges the cost of water would be 13.9 annas per thousand gallons.

41. I wish to acknowledge the help given me in the preparation of this estimate by Mr. A. C. Coubrough of Messrs. Mather and Platt, who has kindly checked the prices of material to be imported; Mr. W. Bell, Electric Engineer, for valuable suggestions and the benefit of his experience in Mussoorie and Dehra Dun, and Mr. S. C. Edgar, District Engineer, Naini Tal, for the use of his records.

The 29th July, 1919.

G. McC. HOEY,

Executive Engineer, 1st Sanitary Division,
Saharanpur.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

FINAL ABSTRACT.

	Rs.
Capital Cost Electric Supply	9,76,622
Ditto Additions and Alterations to Water Supply	1,32,807
Total	11,09,429
Running Expenses of Electric Supply per annum...	1,12,174
Ditto Water ditto	60,240
Total	1,72,414 per annum.

The 29th July, 1919.

G. McC. HOEY,

Executive Engineer, 1st Sanitary Division,

Saharanpur.

HYDRO-ELECTRIC SUPPLY.

ABSTRACT OF COST.

	Rs.
1. Power Station Buildings	56,713
2. Ditto Equipment	1,55,400
3. Power Pipe Lines	2,15,025
4. Transmission and Distribution	2,77,761
5. Sub-station Buildings	10,842
6. Ditto Equipment	66,420
Total	7,82,161
7. Contingencies at 10 per cent.	78,216
Total	8,60,377
8. Sanitary Engineer's fees for preparation and execution at 12 per cent.	1,03,245
Total	9,63,622
9. Land Compensation	10,000
10. Compensation for tree cutting	8,000
Grand Total	9,76,622

The 29th July, 1919.

G. McC. HOEY,

Executive Engineer, 1st Sanitary Division,

Saharanpur.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF RUNNING EXPENSES.

	Rs.
1. Sinking Fund and Interest on a capital of expenditure of Rs. 9,76,622 at Rs. 6 per cent. per annum, compound interest repayable in twenty years, $8.718 \times 9,766.22$	85,142
2. Staff—	
One Electrical Engineer at Rs. 800 per mensem, Rs. 100 horse allowance, Rs. 50 conveyance allowance	950
One Power Station assistant at Rs. 200 per mensem consolidated	200
Three oilers at Rs. 15	45
One cleaner at Rs. 12	12
One fitter at Rs. 50	50
One head linesman at Rs. 50	50
Four linesmen at Rs. 15	60
Three sub-station attendants at Rs. 15	45
One chaukidar at Rs. 9	9
Two holdars at Rs. 8	16
One mate at Rs. 10	10
One peon at Rs. 8	8
One clerk at Rs. 50	50
One storekeeper at Rs. 35	35
One sweeper at Rs. 9	9
Total	1,549 per mensem, Rs. 18,588 per annum.
3. Materials—	
	Per annum.
	Rs.
Lubricant waste and transformer oil at Rs. 2 per 1,000 units generated	1,408
Stationery and printing charges at Rs. 15 per mensem	180
Total	1,588
4. Repairs—	
Buildings at $1\frac{1}{2}$ per cent. on Rs. 35,000	525
Machinery at 3 per cent. on Rs. 1,50,000	4,500
Over head lines at $1/5$ per cent. on Rs. 2,78,000	556
Power pipe lines at $\frac{1}{2}$ per cent. on Rs. 2,15,025	3,075
Total	6,656
5. Rent for telephone line and connections	200

6. Summary of running expenses—

	Per annum,
	Rs.
1. Sinking fund and interest ...	85,142
2. Staff ...	18,588
3. Materials ...	1,588
4. Repairs ...	6,656
5. Rent ...	200
Total ...	1,12,174
Total units delivered per annum ...	7,04,436
Cost per unit ...	2.55 annas.

WATER SUPPLY ARRANGEMENTS.

Estimate of running expenses.

	Rs.
1. Sinking fund and interest charges on a capital of Rs. 1,32,807 at 6 per cent, compound interest repayable in twenty years = per annum $1328 \times 8.718 =$...	11,578
2. Staff—	
Allowance to Electrical Engineer for general supervision at Rs. 100 ...	100
Waterworks Superintendent at Rs. 150 ...	150
One head mistri ...	60
One oiler ...	10
One cleaner ...	12
One chankidar ...	8
One pipe line inspector ...	60
One sweeper ...	10
Total ...	416 p. m. = 4,992 per annum.
3. Power for pumping—	
255,060 units at 2.55 annas ...	40,650
4. Materials—	
Lubricants and waste at Rs. 2 per 1,000 units consumed ...	510
Stationery, printing and water test charges at Rs. 20 ...	240
Total ...	750
5. Repairs—	
Buildings at 1% per cent on Rs. 18,000 ...	270
Machinery at 3 per cent. on Rs. 50,000 ...	1,500
Pipe lines say ...	500
Total ...	2,270

Summary—

			Per annum. Rs.
1. Sinking fund and interest ...	...	...	11,578
2. Staff charges ...	...	...	4,992
3. Power charges...	...	...	40,650
4. Repairs ...	...	...	2,270
5. Materials ..	...	...	750
Total	...	...	60,240

Number of gallons pumped = $(120 \times \frac{1}{2} + 182) \times 22,000 \times 15$
= 69.63 million.

Cost per 1,000 gallons = 13.9 annas.

If sinking fund and interest on previous loan (Rs. 23,014) is added, total annual charges = Rs. 83,254.

Cost of water per 1,000 gallons = 1.2 = 19.2 annas.

The 29th July, 1919.

G. McC. HOEY,
Executive Engineer, 1st Sanitary Division,
Saharanpur.

STATEMENT OF REVENUE ANTICIPATED.

			Rs.
1. Public lighting—			
98,550 units at 3.0 annas	...	...	18,478
2. Private lighting and other purposes—			
292,626 units at 6 annas	...	...	1,09,734
3. Power for pumping—			
255,060 units at 3.0 annas	...	...	47,824
4. Power for heating and cooking—			
58,200 units at 2 annas	...	...	7,275
Total	...	...	1,83,311

The 29th July, 1919.

G. McC. HOEY,
Executive Engineer, 1st Sanitary Division,
Saharanpur.

ABSTRACT OF ESTIMATED DEMAND IN UNITS PER ANNUM.

	Summer.			Winter.			Units per annum.
	Units per day.	Days per annum.	Total units.	Units per day.	Days per annum.	Total units.	
1. Public lighting	270	183	49,410	270	182	49,140	98,550
2. Private							
Bungalows	398	183	72,834	40	182	7,280	80,114
Bazar shops	60	183	10,980	30	182	5,460	16,440
Special buildings	888	214	190,082	40	151	6,040	196,072
3. Power for pumping	1170	120	140,400	630	182	114,660	255,060
4. Power for heating and cooking	60	60	3,600	300	182	54,600	58,200
Total units per annum	...	...	...	...	...	...	704,436

NAINI TAL HYDRO-ELECTRIC SUPPLY.

SCHEDULE OF ALLOWANCE IN UNITS FOR CONSUMERS PER DAY DURING SUMMER.

	Units per day.
1. Street Lighting—	
For 6 hours 1 mile at 2 k. w.	12
" 6 " 1 " " 1 "	6
Total	18
2. Bungalow lighting.	
1st class for 4 hours at 1.25 k. w. $\times 0.5$	2.50
2nd ditto 0.65 " $\times 0.6$	1.56
3rd ditto 0.42 " $\times 0.6$	1.00
3. Bazar shops lighting—	
For Malli Tal and Talli Tal bazars for 4 hours at 20 k. w. $\times 0.75$	60.00
4. Special Buildings (public and private) for 6 hours at 148 k. w. $\times 0.6$	888
5. Power for pumping	1,170
6. Heating and cooking 250 at 2 hours at 0.6 k. w.	300

Estimate of demand in units per day during summer.				...	300
Item.	Quantity.	Units allowed for per day.	Per.	Total units per day.	
1. Street lighting	15	18	mile.	270.00	
2. Bungalows	1st class 30	2.5	each.	75.00	
"	2nd " 130	1.56	"	202.80	
"	3rd " 120	1.00	"	120.00	
3. Bazar shops lighting	...	...	...	60.00	
4. Special buildings	...	...	...	888.00	
5. Power for pumping	...	...	...	1170	
6. Heating and cooking 30 at 2 hours at 1 k. w.	...	...	...	60	

ESTIMATE OF POWER REQUIRED FOR LIGHTING.

(I) Private Bungalows—

1. 1st class bungalows	30 at 1.25 k. w.	37.50 k. w.
2. 2nd ditto	130 at 0.65 "	84.50 "
3. 3rd ditto	120 at 0.42 "	50.40 "

Total ... 172.40 "

Allowing a diversity factor of 0.75, the total power required for lighting private bungalows would be say 130 k. w.

(II) Special buildings (private and public) as per detailed estimate

148 k. w.

Allowing a diversity factor of 0.50 as it includes shops and offices which require light in the afternoon or early in the evening.

Total power say ... 68 k. w.

(III) For Malli Tal and Talli Tal bazars

20 "

Allowing a diversity factor of 0.75 say ... 15 "

Total load for lighting ... 213 "

Peak load say ... 220 "

Estimate of power required for street lighting.

Allowing 150 ft. interval between lamps, the total number of lamps required per mile is 35. Take 15 miles of roads to be provided for. Total number of lamps required 15×35 525

Take 475—55 Watt lamps	...	...	...	26 k. w.
50—100 ditto	...	...	...	5 "
Total power required for street lighting	...	...	...	31 "
Peak load say	...	...	...	32 "

Loads:—

Bungalow lighting	...	...	...	130 k. w.
Special buildings	...	...	...	74 "
Bazar lighting	...	...	...	15 "
Total	...	...	...	219 "

Street lighting	...	...	32 k. w. for 6 hours.
and	...	...	16 " ditto.

Pumping W. S. 35 k. w. for 18 hours.

35 " for 11 "

35 " for 7 "

Government House Irrigation 15 k. w. for 8 hours.

List of bungalows and other buildings has been taken from assessment list for 1917-18.

The bungalows have been classed I, II, and III on the basis of their gross annual values.

	Rs.	Rs.
1st class	1,600	2,500
2nd "	800	1,600
3rd "		800

List of buildings to be provided with lighting—

Special buildings	...	48
Bungalows 1st class...	...	30
2nd "	...	130
3rd "	...	120

Estimate of power for connections.

1. 1st class bungalows:—

Total no. of lights 40	8—55 Watt lamps	...	440 Watts.
	16—32 ditto	...	512 "
	16—17 ditto	...	272 "
			1,224 k. w.
			say 1.25

2. 2nd class bungalows:—

22	4—55 Watt lamps	...	220 Watts.
	8—32 ditto	...	256 "
	10—17 ditto	...	170 "
			646 k. w.
			say .65

3. 3rd class bungalows:—

	2—55 Watt lamps	...	110 Watts.
	6—32 ditto	...	192 "
	7—17 ditto	...	119 "
			421 k. w.
			say 0.42

NAINI TAL HYDRO-ELECTRIC SUPPLY.

LIST OF PUBLIC AND PRIVATE BUILDINGS FOR WHICH SPECIAL ALLOWANCE
HAS BEEN MADE.

Number of assessment list 1917-18.		Power provided for.
20	All Saints Diocesan College	5 k. w.
29-34	Belvedere including cottage and stables (Raja of Ava)	2 "
47	Boys Diocesan school	3 "
48-50	Brook Hill (Nawab of Rampur)	2 "
54	Boat House. His Honour's	2 "
55	Boat shed ditto	1 "
74	Crosthwaite Hospital	5 "
75	The Club	15 "
101	Departmental offices	2 "
117	Exchange the (Messrs. Trevillion and Clarke)	1 "
118	Exchange Villas (Lala Shyama Lal Sah, merchant)	2 "
137-140	Forest offices	1 "
151	Government House	15 "
152	Ditto old or Public Works department buildings	1 "
155-156	Grand Hotel including Cottage	6 "
159	Training, the (Bank of Upper India)	1 "
160	Harmony Hall (Dr. S. S. Deaso)	2 "
187	Kutchery Buildings	2 "
198-200	Langham House (Ayarpatta Sub-division office)	1 "
211	Married Quarters at Sleepy Hollow	2 "
218	Metropole Hotel	5 "
228	Murray & Cos.	2 "
237	Municipal market with its outhouses	1 "
241	Mathew & Co.	2 "
242	Naini Tal District Jail	1 "
243	Newberry Lodge (Agent Messrs. Mathews & Co.)	2 "
246	Norton Lodge Garden (Municipal market ground)	1 "
259-260 } 264-265 }	Philander Smith College including Oak Ridge and cottage	5 "
283-284	Public Works Department Office, new and Press Building	1 "
291	Public Works Department Workshop and Godown at Govern- ment House	2 "
293	Ramnee Convent	2 "
294	Ramsay Hospital	12 "
298	Royal Hotel	5 "
301-308	Rohilla Lodge including Dairy	1 "
306	Reserve Police Lines	1 "
311	Roman Catholic Chapel	1 "
325	Secretariat Offices	5 "
326	Ditto Chaprasis Barrack	1 "
341	St. Francis Home	2 "
342	St. Joseph's College	10 "
345	St. John's Church	1 "
346	St. Mary's and St. Nicholas Church	1 "
351	Sylverton (Allahabad Bank)	1 "
357	Tara and Bhabar offices	1 }
358	Ditto do. canal offices	1 "
360	Tonga stables	1 "
365-367	Volunteer Armoury including Institute and Range	1 "
368	Waverley Hotel	5 "
370-371	Wallerley School	5 "
386	Widows Home	2 "
Total		148 k. w.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

Estimate of requirements in water under severest summer load.

O'clock.	Load k. w.	Load + 10 per cent. k. w.	Per cent. of full load.	Efficiency per cent.	C.ft. per min. at 1,000 ft. head.	Number of sets working.
1 a.m.	121	133	88	72	94	One.
2 "	121	133	88	72	94	"
3 "	101	112	74	70	81	"
4 "	101	112	74	70	81	"
5 "	81	89	59	67	68	"
6 "	120	132	88	72	93	"
7 "	120	132	88	72	93	"
8 "	120	132	88	72	93	"
9 "	120	132	88	72	93	"
10 "	120	132	88	72	93	"
11 "	120	132	88	72	93	"
12 noon	120	132	88	72	93	"
1 p.m.	85	94	62	68	70	"
2 "	70	77	52	64	61	"
3 "	70	77	52	64	61	"
4 "	70	77	52	64	61	"
5 "	35	38	25	43	45	"
6 "	35	38	25	43	45	"
7 "	132	145	96	73	101	"
8 "	257	282	94	73	195	Two.
9 "	262	288	96	73	200	"
10 "	232	255	85	72	179	"
11 "	182	200	67	69	147	"
12 midnight	182	145	96	73	101	One.
Total	...	...	...	...	2,335	

Total cubic feet per day=140,100 at severest load. At average load with diversity factor of 0.6 cubic feet required per day are 86,892.

Estimate of requirements in water under severest winter load.

O'clock.	Load k.w.	Load + 10 per cent. k. w.	Per cent. of full load.	Efficiency per cent.	C.ft. per minute at 1,400 ft. head.
1 a.m.	41	45	30	49	47
2 "	41	45	30	49	47
3 "	36	40	26	44	46
4 "	36	40	26	44	46
5 "	26	29	19	34	43
6 "	26	29	19	34	43
7 "	120	132	88	72	93
8 "	120	132	88	72	93
9 "	120	132	88	72	93
10 "	120	132	88	72	93
11 "	70	77	52	64	61
12 noon	70	77	52	64	61
1 p.m.	35	38	25	43	45
2 "	35	38	25	43	45
3 "	35	38	25	43	45
4 "	...	...	...	...	...
5 "	...	...	...	...	...
6 "	62	68	45	61	57
7 "	107	117	78	71	84
8 "	112	123	82	72	87
9 "	102	112	75	70	81
10 "	82	90	60	67	68
11 "	67	73	48	62	60
12 midnight	62	68	45	60	57
Total	...	...	...	...	1,395

Total cubic feet per day 83,700 at severest load. At average load with diversity factor of 0.6 cubic feet required per day=50,220.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

Calculations of effective head on Pelton wheels.

Length of pressure main, lake intake to Sipahi-dhara	...	3,800	feet.
Length Sipahi-dhara to power station site	...	3,000	"
Total length	...	6,800	"
		=2,267	yards.
R. L. Low water level of lake	...	=6,345	
R. L. Jet centres at power station	...	=4,815	
Static head	...	=1,530	feet.
Loss of head by friction in the pressure main at 630 gallons p.m. through a 10" main 2,267 yards long (Box's Formula)	...	=37	"
Add 10 per cent. for eddy losses at bends	...	=5	
Total loss in power main	...	=41	"
Head on jets	...	=1,489	
Deduct 4 per cent. losses in jets	...	=74	
Effective head on Pelton wheel	...	=1,415	

In calculations for water required, it will be safe to reckon on 1,400 feet effective head.

At 1,400 feet head and excluding all losses 100 K. W. will require $184 \times 33,000$ ($62.4 \times 1,400$) c.ft. per minute = 50.6 c.ft. per minute.

Calculations of storage required for power purposes.

Average daily requirements in summer	...	84,060	c.ft.
Ditto winter	...	50,220	"

Assuming that 90 days of the year even in the driest season require no storage, i.e., that rainfall and springs during this period will suffice for power requirements, 275 days remain for which period complete storage may be necessary. Of this period 135 days may be taken as under winter load conditions and 120 days as under summer load conditions.

Total requirements in storage then :—

Summer 120 days at 84,060 c.ft./day	...	10.09	m.e. feet.
Winter 135 days at 50,220	...	7.8	"
Total	...	17.89	"

The area of the lake at about R. L. 6350 is 5.25 million square feet.

For storage about this level a height of 3.4 ft. is required.

Calculations of size of power main and Pelton wheels.

Normal full load on alternator	...	150	k. w.
25 per cent. overload	...	38	"
Alternator losses at 8 per cent.	...	12	"
Governing	...	2	"
Total	...	202	
		=271	B. H. P.

To develop this a Pelton wheel of 271 B. H. P. is necessary assuming 79 per cent. efficiency for the Pelton wheel the power of jet must be 355 H. P.

$$\begin{aligned} \text{C.ft. per minute required} &= \frac{355 \times 33,000}{62.4 \times 1,400} \dots = 134 \text{ c.ft. p.m.} \\ &= 836 \text{ g. p.m.} \end{aligned}$$

Two 10" mains will pass this flow with a velocity of 2.13 feet per second.

Greatest velocity will take place in the mains when a peak load of 300 k. w. is being met.

Over all efficiency at this load is 73 per cent.

$$\text{H. P. of jets} = 1.34 \times 300 \div 0.73 = 550 \text{ H. P.}$$

$$\begin{aligned} \text{Cubic feet per min. required} &= \frac{550 \times 33,000}{62.4 \times 1,400} \dots = 207.8 \text{ c.ft. min.} \\ &= 1,300 \text{ g. p.m.} \end{aligned}$$

Each 10" main will be required to carry 650 g. p.m. velocity will be 3.32 feet per sec. which is permissible in such circumstances.

CALCULATIONS FOR TAIL RACE CHANNELS.

The maximum discharge which will be required from each set will not exceed 134 c.ft. per minute even with a 25 per cent. overload.

The smallest circular section which can be used if ingress is allowed is a 24" diam. dist. Such a section running half full will when laid at a grade of 1:240 will pass 475 c.ft. per minute at a velocity of 5 ft. per sec. and is therefore suitable.

Recorder Channel.—Allowing a margin for future extension the maximum flow this channel will be required to pass will be 400 c.ft. per min.=7 cusecs say.

To prevent an appreciable velocity of approach to the weir and to obviate the possibility of waves in the channel the velocity must be limited to $\frac{1}{2}$ ft. per sec., 14 sq. ft. area in channel is therefore required.

With a depth of 2' 6" in channel a width of 5' 6" will suffice.

The weir will be 66" in length and at maximum flow will be required to pass 2,500 g. p. m., which is equivalent to 38 g. p. m. per inch of width.

From Box's Tables a depth of 5 $\frac{3}{8}$ " over weir crest will be required for this discharge.

Normally the discharge will not be more than 18 g. p. m. per inch of weir and a depth of 3 $\frac{3}{8}$ " will suffice over crest.

The weir will be built with its crest 24" above floor level of channel, and a baffle plate will be provided to prevent disturbances in the channel.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF REQUIREMENTS IN WATER UNDER SEVEREST
SUMMER LOAD WITH A HEAD OF 950 FT.

O'clock.	C. ft. per minute at 1,400 ft. head.	C. ft. per minute at 950 ft. head.
1 a. m.	94	138
2	94	138
3	81	119
4	81	119
5	68	100
6	93	137
7	93	137
8	93	137
9	93	137
10	93	137
11	93	137
12 noon	93	137
1 p. m.	70	103
2	61	90
3	61	90
4	61	90
5	45	67
6	45	67
7	101	148
8	195	287
9	200	295
10	179	264
11	147	217
12 midnight.	101	148

3,439 c. ft.

Total cubic feet per day 206,340 at severest load. At average load with diversity factor of 0.6, cubic ft. required per day=123,804.

G. McC. HOEY.

The 29th July, 1919

Executive Engineer, 1st Sanitary Division,
Saharanpur.

NAINI TAL HYDRO-ELECTRIC SUPPLY.
RECORDS OF RAINFALL, NAINI TAL BASIN.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total rainfall (inches) per annum.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1890	...	...	...	...	...	18.63	66.37	30	19.5	...	...	...	...
1891	...	...	...	...	...	...	29.78	40.98	12.0	...	...	...	...
1892	...	...	...	...	...	...	8.0	27.0	7.6	...	...	...	...
1893	10.1	10.4	5.0	31.1	1.4	21.4	38.7	20.0	23.2	...	...	...	...
1894	4.9	2.1	4.7	...	1.7	21.2	26.4	29.6	19.0	17.5	1.06	0.5	128.7
1895	...	...	...	...	...	29.4	31.3	33.5	5.3	...	0.8	0.3	...
1896	1.19	3.2	3.4	...	5.9	31.4	15.8	21.7	0.45	...	0.9	1.8	78.2
1897	1.87	2.42	2.68	0.20	1.14	10.65	52.97	20.74	34.07	0.08	0.0	...	135.82
1898	0.09	10.27	0.05	0.60	1.00	18.6	21.5	52.27	11.88	0.30	1.43	3.94	121.93
1899	1.95	2.50	...	2.13	2.43	20.36	41.41	11.91	2.42	...	...	...	85.10
1900	6.98	2.5	0.46	3.29	2.43	8.18	30.53	25.81	11.59	0.44	...	...	101.43
1901	0.34	4.09	1.78	0.28	1.14	3.25	30.41	57.12	9.43	1.29	...	1.65	100.21
1902	1.88	0.17	1.02	1.67	4.74	19.15	31.85	35.28	10.02	1.54	...	...	59.74
1903	2.69	0.81	1.54	1.06	2.75	2.62	15.75	22.03	11.94	6.72	...	...	82.09
1904	2.6	0.1	3.2	0.3	4.3	11.5	28.8	26.3	17.0	0.4	3.9	1.2	97.18
1905	7.3	4.8	3.5	0.1	2.3	7.4	32.3	24.8	7.9	...	0.1	0.9	98.60
1906	1.7	11.6	1.2	0.5	1.3	12.5	23.6	48.8	13.1	1.1	...	0.3	104.30
1907	2.9	8.3	6.4	2.4	10.1	3.51	19.56	17.23	0.20	...	...	...	70.23
1908	2.98	4.72	0.22	0.20	1.58	15.05	24.07	23.33	7.62	0.17	0.50	0.10	80.59
1909	3.18	0.77	0.03	8.37	1.31	39.26	43.22	32.43	5.55	0.23	...	5.24	139.67
1910	1.16	1.45	0.17	0.04	7.07	11.36	59.77	26.86	18.63	21.06	...	...	148.63
1911	7.53	0.06	8.28	1.66	0.04	14.66	13.44	33.96	18.96	0.88	4.01	...	100.62
1912	2.18	1.87	2.69	0.56	3.31	6.11	18.65	26.59	20.53	...	2.88	0.42	85.59
1913	0.31	5.12	4.12	0.63	8.02	32.05	21.59	12.44	4.22	3.42	0.89	3.30	96.11
1914	...	6.24	5.33	2.19	7.19	8.41	33.29	32.18	31.22	0.94	1.38	...	128.27
1915	1.35	8.50	3.81	3.10	1.07	13.3	39.85	43.39	15.56	2.37	...	0.40	133.33
1916	...	1.8	...	0.5	2.9	33.7	26.4	16.2	21.9	4.9	...	...	107.72
1917	0.4	5.2	2.0	2.2	12.9	25.3	37.8	16.5	28.9	5.3	...	1.1	137.76
1918	1.0	...	1.6	2.9	2.8	14.62	32.8	25.7	2.25	...	0.8	...	84.45
1919	12.2	...	2.4	1.2	...	...	...	...	...	...	...	...	...
Average	3.37	3.80	2.52	2.58	3.93	16.80	30.90	29.00	10.05	2.46	0.76	0.98	104

NAINI TAL HYDRO-ELECTRIC SUPPLY.

RECORDS OF LAKE DISCHARGE.

Year.	Total rate of water discharged c.ft. per annum.	Rainfall inches per annum.	Discharge million c.ft. per inch of annual rain- fall.
1890	...	...	...
1891	...	...	...
1892	...	...	...
1893	...	...	...
1894	55,209,600	128.70	0.43
1895	...	...	...
1896	82,399,240	78.20	1.05
1897	No records	...	...
1898	" "	...	...
1899	120,468,560	85.10	1.42
1900	103,194,290	101.43	1.01
1901	210,109,440	100.21	2.19
1902	129,032,405	59.74	2.16
1903	70,607,070	82.09	0.86
1904	261,337,709	97.18	2.69
1905	238,096,845	98.60	2.41
1906	343,159,160	104.30	3.30
1907	95,739,280	70.23	1.35
1908	122,640,220	80.59	1.52
1909	392,773,840	139.67	2.83
1910	542,700,356	143.63	3.65
1911	208,588,680	100.62	2.08
1912	144,736,710	85.59	1.69
1913	188,736,065	96.11	1.96
1914	357,996,455	123.27	2.79
1915	331,336,670	133.33	2.48
1916	324,061,670	107.72	3.03
1917	451,633,117	137.76	3.28
1918	...	84.45	...

The average discharge from lake amounts to about 232,141,000 c.ft. per annum.

The maximum recorded discharge took place from the lake outlet in October 1910, and is by far greater than any other discharge recorded in the period for which records are available. The details of this rainfall are as follows:—

Date.	Inches rainfall.	Gauge level.	Discharge and overflow in million c.ft. per day.	Run off in inches per 24 hours.
27th September, 1910	0.23	4.17	2.56	0.31
28th September, 1910	0.34	4.15	3.37	0.47
29th September, 1910	0.02	3.95	4.83	0.67
30th September, 1910	0.75	3.60	2.20	0.31
1st October, 1910	3.19	4.20	7.44	1.00
2nd October, 1910	0.25	5.00	44.67	0.13
3rd October, 1910	10.03	4.75	11.56	1.61
4th October, 1910	0.07	4.20	9.66	1.34
5th October, 1910	0.99	3.90	6.33	0.88
6th October, 1910	0.00	3.90	3.83	0.53

NAINI TAL HYDRO-ELECTRIC SUPPLY.

CALCULATIONS.

Floor of lake bridge and zero of lake gauge =

6,349.90 R. L.

Weir crest level = 6,353.65 R. L.

= 3.75 of gauge.

Catchment area of lake :—

1,980 acres = 43,560 × 1,980 sq. ft.

= 86.2 million sq. ft.

1" rainfall over this catchment = 7.18 million c.ft.

Allowing 12" rainfall with 50 % run — off 43.08 million c.ft. would be a possible discharge.

The eight weirs will pass at maximum flow.

8 × 0.462 million gallons,

= 3.696 million gallons.

6354.9 = H. F. L. of lake.

6355.9 = level of lowest road.

Allow 1 ft. of free board.

Put sill at 4.0 of gauge.

L. W. L. would be—3.0 on gauge.

Table showing fall in lake levels between the date of highest level after shutting sluices, at end of rains, and the date of lowest level in lake, immediately before the ensuing rains.

Date.	Gauge level.	Date.	Gauge level.	Total fall (ft.)	Rainfall in interval (inches).
1	2	3	4	5	6
4th November, 1918	3.90	17th May, 1919	1.35	1.55	17.15
30th November, 1917	4.20	2nd June, 1918	1.50	2.70	9.44
21st November, 1916	3.95	4th May, 1917	1.95	2.00	10.60
3rd November, 1915	3.80	29th May, 1916	0.00	3.80	6.97
21st November, 1914	4.10	13th June, 1915	1.55	2.55	22.77
4th November, 1913	3.40	31st May, 1914	1.70	1.70	24.15
25th November, 1912	4.10	12th May, 1913	1.40	2.70	1.75
25th November, 1911	4.20	16th June, 1912	1.00	3.20	11.47
6th December, 1910	4.20	10th June, 1911	1.80	2.40	19.12
24th October, 1909	4.00	26th May, 1910	1.00	3.00	13.71
16th October, 1908	3.60	2nd June, 1909	0.80	2.80	14.78
5th November, 1907	1.70	16th June, 1908	—1.00	2.70	15.73
14th November, 1906	3.40	13th June, 1907	2.10	1.30	29.63
26th October, 1905	3.75	16th June, 1906	1.10	2.65	17.82
8th November, 1904	3.80	17th June, 1905	2.10	1.70	26.17
24th October, 1903	3.15	14th June, 1904	0.70	2.45	11.39
4th November, 1902	2.75	13th May, 1903	0.65	2.10	6.41
23rd November, 1901	2.90	1st July, 1902	0.50	2.40	11.13
24th October, 1900	2.90	24th June, 1901	1.07	1.83	21.66
3rd October, 1899	2.49	28th May, 1900	0.78	1.71	15.66
4th November, 1898	3.00	12th June, 1899	0.30	2.70	14.38
8th November, 1897	2.93	6th June, 1898	0.43	2.50	23.43
7th October, 1896	2.71	12th June, 1897	—0.45	3.16	21.92

G. McC. HOBY,

The 29th July, 1919.

Executive Engineer, 1st Sanitary Division,
Bihar, Bihar.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF POWER STATION BUILDINGS.

			Rs.
1. Power Station	...	...	28,830
2. Tail Races, Channel and Recorder	...	...	7,629
3. Staff quarters	...	...	9,629
4. Driver's quarters	...	...	6,233
5. Inspection house	...	...	3,472
6. Sweeper's Hut	...	...	920
Total	...	...	56,713

ESTIMATE OF POWER STATION BUILDING.

		Rs. a. p.	Rs.
1. Excavation	... 13,435 c.ft.	6 0 0 % c.ft.	80
2. Lime concrete in foundation.	14,564 c.ft.	20 0 0 % c.ft.	2,912
3. Coursed rubblestone masonry in lime.	21,116 c.ft.	23 4 0 % c.ft.	5,965
4. Stone arch masonry	286 c.ft.	30 0 0 % c.ft.	86
5. Iron-work	... 1.8 cwt.	74 0 0 per cwt.	133
6. British rolled steel beams	23.43 cwt.	25 0 0 per cwt.	586
7. Stone-work	... 52 c.ft.	6 8 0 per c.ft.	338
8. Concrete over roof	918 c.ft.	21 4 0 % c.ft.	195
9. Lime plaster	... 12,808 s.ft.	4 8 0 % s.ft.	486
10. Cement pointing	... 9,409 c.ft.	5 8 0 % c.ft.	517
11. 3" vitrified tile flooring.	3,920 s.ft.	0 8 0 per s.ft.	1,960
12. Salwood work	... 77 c.ft.	4 8 0 per c.ft.	346
13. Teakwood doors and windows & including fitting.	563 s.ft.	5 8 0 per s.ft.	1,408
14. Whitewashing	... 10,503 s.ft.	0 6 6 per s.ft.	43
15. Sliding doors	... 100 s.ft.	3 0 0 per s.ft.	300
16. Reinforced cement concrete.	972 s.ft.	2 10 0 c.ft.	2,552
17. Cornice	... 151 s.ft.	0 8 0 s.ft.	76
18. Sheet iron sunshade	21	8 0 0 each.	168
19. Chipwood planking 1/2" thick.	4,194	21 4 0 % s.ft.	891
20. 22 B. W. G. Sheet iron roof including iron trusses.	4,194 s.ft.	2 0 0 % s.ft.	8,388
21. Stone cobb pavement	5,837 s.ft.	15 0 0 % s.ft.	883
22. Constructing retaining and levelling site as per attached estimate.	...	...	517
Total	...	...	28,830

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF DUCTS, TAIL RACE, OUTLET CHANNEL AND RECORDER CHAMBER.

	Rs.
Outlet Chamber and Recorder Chamber ...	1,487
Ducts ...	2,440
Tail Race ...	1,702
Recorder Chamber ...	2,000
Total ...	7,620

ESTIMATE OF OUTLET CHANNEL.

Abstract of Cost.

		Rs. a. p.	Rs.
1. Excavation ...	9,484 c.ft.	6 0 0 % c.ft.	56
2. Lime concrete ...	1,018 c.ft.	20 0 0 % c.ft.	203
3. Coursed rubble stone masonry in line.	3,015 c.ft.	28 4 0 % c.ft.	851
4. Boulder pitching ...	137 c.ft.	7 0 0 % c.ft.	10
5. Reinforced P.C. concrete.	7.0 c.ft.	2 10 0 c.ft.	18
6. Concrete plaster ...	1,220 s.ft.	8 2 0 s.ft.	99
7. Recorder Chamber ...	...	...	250
Total ...	...	...	1,487

ESTIMATE OF STAFF QUARTERS.

Abstract of cost.

		Rs. a. p.	Rs.
1. (a) Earthwork in cutting.	2,982 c.ft.	6 0 0 % c.ft.	18
(b) Earthwork in filling.	711 c.ft.	3 0 0 % c.ft.	2
2. Lime concrete in foundations in line.	1,337 c.ft.	20 0 0 % c.ft.	267
3. Coursed rubble stone masonry.	3,961 c.ft.	28 4 0 % c.ft.	1,113
4. Coursed rubble stone in clay.	5,446 c.ft.	21 0 0 % c.ft.	1,144
5. P. C. concrete slabs	54 c.ft.	2 10 0 c.ft.	247
6. Stone arch masonry	194 c.ft.	30 0 0 % c.ft.	58
7. Floor concrete in lime.	542 s.ft.	20 0 0 % c.ft.	108
8. Lime plaster ...	8,297 s.ft.	4 8 0 % s.ft.	373
9. 4" Slate flooring ...	1,994 s.ft.	35 5 0 % s.ft.	704
10. Salwood railing 3' high.	120 s.ft.	1 0 0 s.ft.	126
11. Salwood work ...	322 c.ft.	4 8 0 c.ft.	1,449
12. 1" Chinwood ceiling	1,573 s.ft.	21 10 0 % s.ft.	340
13. Doors and windows panelled and glazed (tinwood).	345 s.ft.	1 6 0 s.ft.	475
Battened doors ...	78 s.ft.	1 4 0 s.ft.	98

					Rs.
14.	22 B. W. G. sheet iron.	1,904 s.ft.	105 0 0 % s.ft.		1,999
15.	Painting and Varnishing.	5,456 s.ft.	5 11 0 % s.ft.		313
16.	Ironwork	2 cwt.	74 0 0 cwt.		148
17.	White washing	8,297 s.ft.	0 6 0 % s.ft.		34
18.	Sheet iron sun shade	12	8 0 0 each.		96
19.	Stonework	2,025 s.ft.	6 8 0 % s.ft.		132
20.	Retaining wall and levelling site as per detailed estimate.	...	...		385
Total					9,629

ESTIMATE OF DRIVER'S QUARTERS.

Abstract of cost.

		Rs. a. p.	Rs.
1.	Earthwork ...	1,330 c.ft. 6 0 0 % c.ft.	8
2.	Coursed rubblestone masonry in lime.	2,351 c.ft. 28 4 0 % c.ft.	644
3.	Lime concrete in foundation.	1,056 c.ft. 20 0 0 % c.ft.	211
4.	¾" Slate flooring ...	945 c.ft. 35 5 0 % c.ft.	334
5.	Coursed rubble masonry in clay.	2,629 s.ft. 21 0 0 % s.ft.	552
6.	Cement concrete batels.	50 c.ft. 2 10 0 c.ft.	131
7.	Earth filling ...	535 c.ft. 3 0 0 % c.ft.	2
8.	Doors and windows	343 s.ft. 1 6 0 s.ft.	472
9.	Salwood work ...	131 c.ft. 4 8 0 c.ft.	590
10.	4" Chirwood ceiling	1,503 s.ft. 21 10 0 % s.ft.	325
11.	Limo plaster ...	5,803 s.ft. 4 8 0 % s.ft.	261
12.	Whitewashing ...	5,803 s.ft. 0 6 6 % s.ft.	24
13.	Painting and varnishing.	3,982 s.ft. 5 11 0 % s.ft.	215
14.	Stone work	8 s.ft. 6 8 0 s.ft.	52
15.	Ironwork ...	1.5 cwt. 74 0 0 cwt.	111
16.	Sheet iron sunshades	6 8 0 0 each.	48
17.	22 B. W. G. sheet iron roofing.	1,760 s.ft. 105 0 0 % s.ft.	1,848
	Site cleaning.		
18.	Retaining wall and levelling as per detailed estimate.		386
Total			6,238

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF INSPECTION HOUSE.

		Rs. a. p.	Rs.
1. Earthwork—			
(a) Excavation	778 c.ft.	6 0 0 % c.ft.	5
(b) Filling ...	283 „	3 0 0 „	1
2. Concrete in lime...	493 „	20 0 0 % c.ft.	99
3. Coursed rubble stone masonry in lime.	1,331 „	28 4 0 „	376
4. Coursed rubble stone masonry in clay.	1,782 „	21 0 0 „	375
5. Reinforced concrete slabs.	36 „	2 10 0 per c.ft.	95
6. Cornice complete...	187 s.ft.	0 6 0 per s.ft.	70
7. Slate flooring $\frac{1}{2}$ " ...	629 „	35 5 0 % s.ft.	221
8. Lime plaster ...	3,447 „	4 8 0 „	155
9. Salwood work ...	14.5 c.ft.	4 8 0 „	65
10. Doors and windows of Tunwood.	151 s.ft.	1 6 0 per s.ft.	208
11. Stonework ...	7.5 c.ft.	6 8 0 per c.ft.	49
12. Wood work for roof	88.3 „	9 8 0 per c.ft.	398
13. Ironwork ...	1 cwt.	74 0 0 per cwt.	74
14. Chirwood planking $\frac{1}{2}$ "	528 s.ft.	21 10 0 % s.ft.	114
15. Galvanized sheet iron.	548 „	105 0 0 „	576
16. Painting and varnishing.	2,394 „	5 11 0 „	137
17. Clearing site ...	Lump sum...	...	440
18. White washing ...	3,447 s.ft.	0 6 6 „	14
Total ...			3,472

ESTIMATE OF SWEEPER'S QUARTERS.

Abstract of cost.

		Rs. a. p.	Rs.
1. Earthwork in excavation.	247 c.ft.	6 0 0 % c.ft.	1
2. Kankar lime concrete.	129 „	20 0 0 % c.ft.	26
3. Coursed rubble stone masonry in lime.	446 „	28 4 0 „	126
4. Coursed rubble stone masonry in clay.	504 „	21 0 0 „	125
5. Re-inforced concrete slab.	9 „	2 10 0 c.ft.	14

		Rs. a. p.	Rs.
6. $\frac{1}{2}$ " Slate flooring...	80 s.ft.	35 5 0 % s.ft.	28
7. Doors and windows	52 "	1 0 4 s.ft.	65
8. Salwood work ...	15 c.ft.	4 8 0 c.ft.	68
9. $\frac{1}{4}$ " Chirwood ceiling	127 s.ft.	21 10 0 % s.ft.	29
10. Lime plaster ...	1,265 "	4 8 0 "	61
11. White washing ...	1,365 "	0 6 6 "	6
12. Painting and var- nishing.	392 "	5 11 0 "	22
13. Ironwork ...	25 cwt.	74 0 0 cwt.	19
14. 22 B. W. G. sheet iron roofing.	133 s.ft.	105 0 0 % s.ft.	140
15. Retaining wall and levelling site as per estimate.	...	...	182
Total			920

POWER STATION EQUIPMENT.

Estimate.

	Rs.
1. Three sets, direct coupled Pelton wheels 272 B. H. P. 750 R. P. M., to three phase alternators 3,300 volts, 50 cycles with self-contained exciters, oil pressure governors with combined slow motion needle and jet deflector gear, and with emergency hand regulating valves and connections erected and complete and tested @ Rs. 27,000 each ...	81,000
2. Switch-board containing three generator, one spare, one feeder, one auxillary and one regulator panels, one swing synchroniser panel, watt-hour meters, volt meters, ammeters, time fuses and automatic release, oil switches, totally enclosed, bus bars and all connections complete and erected ...	21,000
3. Two 12.5 K. V. A. three phase transformers 3,300 : 380 with all connections complete to bus bars and auxiliary panel ...	5,000
4. Isenthal lightning arrester gear and connections to earth and line, including horn arrestors, isolating switches complete and erected ...	12,000
5. One three-ton hand traveller crane and 80 ft. of run- way erected complete ...	4,500
6. Workshop equipment as per estimate below ...	27,150
7. Ten 150 c. p. lighting points with connections, four of which must be off exciter circuit ...	500
8. Spares for alternators and motors ...	3,500
9. Office furniture ...	750
Total	1,55,400

NAINI TAL HYDRO-ELECTRIC SUPPLY.

WORKSHOP EQUIPMENT.

Estimate.

	Rs.
1. One 10½" centre, self-acting, sliding surfacing and screw cutting lathe	6,000
2. One bench lathe	750
3. One large machine drill	2,250
4. One small ditto	500
5. One bench emery grinder (double)	300
6. Ditto drill	300
7. One machine saw for metal with spares	450
8. One double set Whitworth taps and dies... ..	450
9. One set " gas " taps and dies... ..	750
10. One smith's forge with electric blower	2,500
11. One set high speed twist drills	750
12. Two fitters vices (large size)	200
13. Two 5 B. H. P. three phase induction motors	5,000
14. Line shafting with bearings and brackets for above... ..	1,250
15. Ten lighting points complete	400
16. Workshop Benches and Lockers	500
17. Small tools, gauges etc.	1,500
18. Sundries (fuel, lead, paint white metal etc.)	1,500
19. One drying oven for coils	500
20. One vacuum cleaner with electric motor	1,300
Total	27,150

ESTIMATE OF POWER PIPE LINE.

	Rs.
1. Hard Rock. 3,300 ft. × 4'—6" × 4' 594,000 cft. at Rs. 50	2,970
2. Soft Rock. 3300' × 4'—6" × 4' 59,400 " " 25	1,485
3. Repairs to road surface, to parapets, culverts and retaining walls	750
4. Cost of 5,000 ft. run of double 10" steel main 5 W. G. suitable for 1,020' working head including laying and jointing at Rs. 25.5 per r.ft.	1,27,500
5. Cost of 600 ft. run of double 10" steel main ½" thick suitable for 1,260 ft. working head including laying and jointing at Rs. 28, per ft.	16,800
6. Cost of 1,200 ft. run of double 10" steel main 5/16" thick suitable for 1,600 ft. working head including laying and jointing at Rs. 34. per ft.	40,800
7. Sleeve pipes bends and valves and air valves at 5 per cent. on 185,100	9,255
8. Concrete thrust blocks and holding down bolts as per estimate attached	4,032
9. Inlet arrangements at lake as per estimate attached	10,533
Total	2,15,025

NAINI TAL HYDRO-ELECTRIC SUPPLY.

Cost of 10" main for 1,600 ft. head.

Thickness 5/16" coated with Angus Smith's solution and fitted with "Albion joint."

	£.	s.	d.	
	0	18	6	C. I. F. Bombay.
	Rs. 14 per foot			
Weight.	35.70 lbs. per foot.			
	3,570	„	„	chain.
Add for joints	430	„	„	
	4,000 lbs. per 100 feet.			
	40.00	„	„	foot 0.86 cwt. per foot.
Railway freight at Rs. 1-8-0 per cwt. is 0.54 per foot.	...	...	...	0.54
Loading and cartage to site at Rs. 1-8-0 per cwt. is 0.54	...	...	...	0.54
per foot	...	...	...	0.54
Laying, fixing and bolting at Rs. 1	...	...	...	0.36
	Total			1.44
Total per pipe laid and fixed	...	...	...	15.5 per foot.
Add ten per cent. for breakage and spares	...	...	...	1.8
				17.0 per foot

10" main 1,260 head thickness 1/2"

	£.	s.	d.	
	0	15	3	C. I. F. Bombay.
	Rs. 11.5 per ft.			" "
Weight.	28.85 lb. per foot.			
	2,885	"	"	chain.
Add for joints	340	"	"	"
	32.25 lbs. per foot.			0.26 cwt.

Cost of 10" main for Rs. 1,260 head.

			Rs.
Railway freight at Rs. 1-8-0	...	...	0.44
Loading and cartage at Rs. 1-8-0	...	...	0.44
Laying, fixing and bolting at Rs. 1...	...	...	0.29
	Total		1.17 per foot
	Rs.		
Total for pipe laid and fixed	...	...	12.67
Add 10 per cent. for breakage and spares	...	...	1.26
	Total		13.93 says Rs. 14 per foot

Cost of 10" main for 1,020 ft. head thickness 5 W. G.

	£.	s.	d.	
	0.	14	11	C. I. F. Bombay.
	Rs. 10.6 per foot.			
Weight.	25.56 lbs. per foot.			
	2,456	lbs. per chain.		
Add for joints	340	"	"	"
	28.00 lbs. per foot			
	0.26 cwt. per foot.			

		Rs.
Railway freight at Re. 1-8-0	...	0.38
Loading and cartage at Re. 1-8-0	...	0.38
Laying, fixing and bolting at Re. 1	...	0.25
		<u>1.01 per foot.</u>
Total for pipe laid and fixed	...	1.16 per foot.
Add ten per cent. for breakage and spares	...	1.17
Total	...	<u>12.76 per foot.</u>

POWER PIPE LINE.

Estimate of Concrete Thrust Blocks and Holding Down Bolts and Clips,
Lbs.

Per Block.

Two 5'-6" one inch diameter bolts with washers and nuts complete at 30 lbs.	...	60
One semi-circular steel clip	...	12
Total	...	<u>72</u>

Rs.

For one hundred block.

7200 lbs. = 65 cwt. at Rs. 30	...	1,950
Excavation of ground—		
100 × 3' × 3' × 5' = 4,500 cft. at Rs. 20	...	90
Portland Cement Concrete—		
100 × 3' × 3' × 5' = 4,500 cft. at Rs. 1,375	...	6,180
Total	...	<u>8,220</u>

For sixty such blocks complete and laid the cost will be ... 4,932

ESTIMATE OF INLET ARRANGEMENT TO POWER PIPE LINE.

Abstract of cost

Description of work.	Quantity.	Rate.	Total. Rs.
1. Excavation in rock	3,025	50/1000 c. ft.	151
2. Coarse rubble stone masonry	1,032	28/4 100 "	292
3. P. C. concrete	1,087	1/6 "	1,495
4. Reinforced concrete	611	2/10 "	1,604
5. Iron rock (Angle rock, etc.)	8.8	74 c. wt.	652
6. 15" sluice valves	4	525	2,100
7. 1/2" mesh wire netting	80 s. ft.	1 s. ft.	80
8. Timber baulks	68	4/8	306
9. 15" diameter steel main	130 ft.	20 ft.	2,600
10. C. I. Angle branch 15"	1	24 cwt.	198
11. 1/4th C. I. bend	1		132
12. C. I. tee	1		138
13. 15" 10" reducers	2		175
14. 1/2" mesh expanded metal	10 s. ft.	1 s. ft.	10
melting.			
15. Buoy and chain connection	1		500
16. C. I. collar for the mouth of inlet pipe.	1		100
Total			<u>10,533</u>

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF TRANSMISSION AND DISTRIBUTION.

Hard drawn, high conductivity copper wire, delivered and erected—

	Rs.
H. T. Transmission 7,627 lb. at $\frac{1}{4}$	9,534
L. T. distribution 96,692 lb. at $\frac{1}{4}$	1,20,865
Single H. T. line 0.51 mile at Rs. 6,600	3,366
Single L. T. line 12.67 miles at Rs. 6,600	83,622
Combined H. T. and L. T. line 2.67 mile at Rs. 10,857	28,988
Lighting circuits and equipment, 15.34 mile at Rs. 2,046	31,386
Total	2,77,761

SCHEDULE OF LENGTHS OF H. T. TRANSMISSION AND L. T. DISTRIBUTION.

1. Single high tension line. Generating station—Line F1 D1 sub-station, 900 yards.		
2. H. T. and L. T. combined		L. T. single.
Sub-station I	2,167	7,759
Ditto II	1,680	9,953
Ditto III	857	4,581
Totals	4,704 yds.	22,293 yds.

	Mile.
1. Single high tension line 900 yards	0.51
2. Single low tension line 22,293 yards	12.67
3. Combined H. T. and L. T. line 4,704 yards	2.67

ESTIMATE OF POLES AND POLE EQUIPMENT PER MILE OF SINGLE H. T. LINE.

	Rs.
33 single poles as per estimate I	6,600
Estimate of poles and pole equipment per mile of single L. T. line.	
33 single poles as per estimate III	6,600
Estimate of poles and pole equipment to carry both H. T. and L. T. line per mile.	
33 poles and equipment as per estimate IV	10,857
Allowance per mile for lighting equipment	
83 x 62	2,046

I—ESTIMATE OF SINGLE H. T. POLES.

	Rs.
1. 38' 4" medium Hamilton steel pole delivered and erected	125
2. Socket and base plate	6
3. Pole cap and earth wire clip	2
4. Galvanized malleable C. I. insulator brackets with bolts, nuts and washers	8
5. 3 H. T. brown porcelain triple petticoat insulator with W. I. stems, washers and nuts tested to 6,600 volts	36
6. Excavation and rammed earth filling per pole	7
7. Concrete slab	4
8. Earth plate and connection per pole	2

	Rs.
9. Painting per pole	6
10. Barb wire fender	2
11. Earth wire spans	3
Total	200

II.—ESTIMATE OF GUARDING A H. T. SPAN.

1. L. iron frame $\frac{1}{2}$ maund at Rs. 30 per maund ...	15
2. No. 10 G. I. wire 1 maund at Rs. 50 per maund ...	50
Total	65

III.—ESTIMATE OF L. T. SINGLE POLE.

	Rs.
1. 37'—4" medium Hamilton Steel Pole delivered and erected	125
2. Socket and base plate	6
3. Pole Cap and earth wire clip	2
4. Galvanised malleable C. I. insulator brackets with bolts, nuts and washers	8
5. 6 L. T. white porcelain 380 volt insulators tested to 2,000 volts with G. W. I. stems and nuts	30
6. Excavation and filling	7
7. Concrete slab	4
8. Earth plate and connection per pole	2
9. Painting per pole	5
10. Barb wire fender	2
11. Earth wire spans at 3	3
12. Neutral wires per span	6
Total	200

IV.—ESTIMATE OF SINGLE POLE TO CARRY BOTH H. T. AND L. T. LINES.

	Rs.
1. Total as per estimate I	200
2. Extra for heavy pole	25
3. Guarding as per estimate II	65
4. 5 L. T. brown porcelain 380 volts insulators tested to 2,000 volts with G. W. I. stems and nuts	25
5. Malleable C. I. brackets with bolts and nuts	8
6. Neutral wires per span	6
Total	329

V.—ESTIMATE OF ADDITIONAL ALLOWANCE TO BE MADE PER SPAN FOR LIGHTING CIRCUIT AND FITTINGS.

	Rs.
1. No. 8 S. W. G. copper lighting circuit span including bracket and insulators	30
2. Lamp bracket	10
3. Lamp holder and reflector with 50 volt bulb and connection complete	7
4. Lighting switches at Rs. 150 for ten span	15
Total	62

CALCULATIONS OF COPPER FOR DISTRIBUTION.

Sub Station II.

From junction	To junction	Length in yards	K. W. re- sured D. factor G.	K. W. taking power fac- tor S.	Amps.	Voltage at end of section.	Volts drop in section.	Volts drop per 1,000 yards.	Ohms per 1,000 yards.	Copper section S. W. G.	Weight per 1,000 yards for three phases.	Total weight in lbs.
V1	P2	227	3.0	3.75	9.87	364.8	3.0	4.1	0.42	2	3X692	1,509
U4	T2	500	3.0	3.75	9.87	367.8	3.0	6.0	0.61	5	3X409	613
T2	S2	307	6.6	8.25	21.71	367.8	1.3	4.2	0.19	000	3X1257	1,158
V2	S2	283	0.6	0.75	1.57	369.1	4.3	18.5	9.89	6	3X385	284
S2	Q2	373	11.4	14.25	37.50	369.1	4.0	4.1	0.11	2X000	3X1257	7,898
R2	Q2	200	0.6	0.75	1.97	373.1	3.3	41.5	21.07	6	3X385	201
Q2	N2	840	13.2	16.50	43.42	373.1	3.4	4.0	0.09	2X000	3X1257	6,335
Q2	N2	233	1.6	2.00	5.26	376.3	11.7	40.0	7.60	6	3X385	294
S2	M2	233	14.4	18.00	47.37	376.5	1.0	4.2	0.09	2X000	3X1257	1,757
P2	M2	780	0.6	0.75	1.97	377.0	12.7	16.3	8.27	6	3X385	782
U2	B2	320	10.2	20.25	38.19	377.5	1.5	4.0	0.27	3X000	3X1257	4,299
F2	F2	1,060	4.2	5.25	13.82	379.0	6.3	6.0	0.43	2	3X092	2,201
F2	B2	147	8.4	10.50	27.63	371.1	0.8	5.4	0.20	000	3X1257	554
D2	E2	983	8.4	10.50	27.63	371.9	7.1	7.6	0.27	0	3X094	2,070
L2	G2	907	18.0	20.25	51.18	371.9	5.4	6.0	0.10	2X000	3X1257	6,341
Q2	B2	387	20.4	25.50	67.11	377.3	1.7	6.0	0.09	2X000	3X1257	2,165
P2	C2	513	3.0	3.75	9.87	373.0	10.1	19.7	2.00	6	3X335	515
L2	C2	840	3.6	4.50	11.84	364.8	10.1	20.7	2.51	6	3X385	341
O2	B2	207	8.4	10.50	27.63	374.9	4.1	19.8	0.72	6	3X335	208
P2	A2	200	54.0	67.50	177.63	379.0	0.9	4.5	0.03	3X7/0	3X2225	4,005
L2	J2	640	3.6	4.50	11.84	373.3	8.7	13.0	1.15	6	3X385	643
F2	J2	433	4.8	6.00	15.79	373.5	5.7	20.0	1.27	6	3X323	435
J2	A2	467	15.6	19.50	51.33	373.5	6.4	13.7	0.27	0	3X951	1,337
H2	Sub D	33	59.6	87.00	238.95	379.9	0.1	3.0	0.01	3X7/0	3X2225	660
Total		11,633				380.0						47,695

NAINI TAL HYDRO-ELECTRIC SUPPLY.

CALCULATIONS OF COPPER FOR HIGH TENSION TRANSMISSION.

From junction.	To junction.	Length in yards.	K. W. required.	K. W. taking power factor .8.	Amperes.	Voltage at end of section.	Volts drop in section.	Volts drop per 1,000 yards.	Ohms per 1,000 yards.	Copper section S. W. G.	Weight per 1,000 yards.	Total weight in lbs.
III ...	A ...	890	100	125	37.88	3,000 3,053	53	60	1.58	6	3 X 335	894
IV ...	A ...	200	105	131.25	39.77	3,000 3,053	53	265	6.66	6	3 X 355	201
A ...	B ...	610	205	256.25	77.65	3,053 3,090	37	61	0.79	6	3 X 335	613
II ...	B ...	33	115	143.75	43.56	3,080 3,090	90	303	6.96	6	8 X 335	33
B ...	C ...	1,360	280	350.00	108.02	3,090 3,201	111	60	0.57	4	3 X 489	2,729
I ...	C ...	300	115	143.75	43.56	3,080 3,201	121	403	9.25	6	3 X 335	301
C ...	General station.	1,650	350	437.50	132.58	3,201 3,300	99	60	0.45	3	3 X 577	2,856
Total ...												7,627 lbs.

NAINI TAL HYDRO-ELECTRIC SUPPLY.

ESTIMATE OF SUB-STATION BUILDINGS.

Description of work.	Quantity.	Rate.	Amount. Rs.	Total Rs.
1. Excavation ...	1,716 c.ft.	6% c.ft.	10	
2. Concrete in lime	161 c.ft.	20% c.ft.	152	
3. Stone source rubble masonry in lime.	1,599 c.ft.	28/4% c.ft.	452	
4. Stone source rubble masonry in clay.	4,168 c.ft.	21% c.ft.	875	
5. Cornices complete	100 s.ft.	4 p.r s.ft.	25	
6. P. C. concrete lintels.	15 c.ft.	2/10 c.ft.	39	
7. Archwork ...	33 c.ft.	30% c.ft.	10	
8. Reinforced concrete	85 c.ft.	2/10 c.ft.	203	
9. Doors and windows	70 s.ft.	1/6 per s.ft.	26	
10. Salwood work ...	39 c.ft.	4/8 per c.ft.	176	
11. Lime plaster ...	32,31 s.ft.	4/8% s.ft.	145	
12. 3" Slab flooring ...	416 s.ft.	35/5% s.ft.	147	
13. Lime Pointing ...	2,400 s.ft.	2/10 s.ft.	63	
14. Iron work ...	3'0 cwt.	74 cwt.	222	
15. 22 B. W. G. sheet iron.	537 s.ft.	105% s.ft.	564	
16. 1/2" Chirwood ceiling.	511 s.ft.	21/10% s.ft.	111	
17. Gutters 9" ...	32 s.ft.	2/12 s.ft.	88	
18. Down pipe 4" ...	25 s.ft.	2/8 per s.ft.	63	
19. White washing ...	3,231 s.ft.	6/6% s.ft.	13	
20. Pointing and varnishing.	1,056 s.ft.	5/11% s.ft.	60	
21. Site clearing ...	L. S.		100	
Total ...			Rs. 3,614	
For three such sub-station buildings				Rs. 10,842

SUB-STATION EQUIPMENT.

	Rs.
1. Two 125 K. V. A. Westinghouse transformers, oil cooled with all connections complete delivered erected and tested at Rs. 6,000 ...	12,000
2. Switch board containing three panels with totally enclosed switches, automatic time release, volt meters, ammeters time piece and all connections complete and erected at Rs. 3,000 ...	3,000
3. Isenthal lightning arresters with horn gaps, earth and line connections complete and erected at Rs. 2,500 ...	2,500
4. Six lighting points at Rs. 40 ...	240
5. Out-take arrangements for two lines at Rs. 200 ...	400
Total ...	18,140
For three sub-stations ...	54,420

ESTIMATE OF WATER SUPPLY ALTERATIONS AND ADDITIONS.

	Rs.
1. Alterations to Filter House...	9,000
2. Two motor driven three throw pumps head 1,300 ft. 63 g. p. m. with gear erected complete and tested, Rs. 8,500	17,500
3. Three sets, motor with extended shaft to drive centrifugal pump at either end, either in series at 475 ft head and 170 g. p. m. or in parallel at 250 ft. head at 360 g. p. m. with all valves and connections complete, erected and tested at Rs. 12,500	37,500
4. Two 125 K. V. A. Westinghouse Transformers 3 phase 3,300: 330 oil immersed with all connections complete and erected at Rs. 6,000	12,000
5. Switchboard containing motors one spare and one auxiliary panels with volt meters and ammeters and all connections complete and erected	7,500
6. One three ton overhead hand traveller crane and runway	3,500
7. One set Isenthal lightning arrestors with horn gaps and choking coils and earth connections all complete and erected	2,500
8. Cost of additions and alterations to rising mains as per attached estimate	18,798
9. Contingencies at Rs. 10 per cent.	10,780
Total	1,18,578
10. Sanitary Engineer's fees for preparation and construction at 12 per cent.	14,229
Grand Total	1,32,807

WATER SUPPLY ARRANGEMENTS.

Estimate of cost of alterations and additions to rising mains.

	Rs.
1. Excavating lifting and relaying 346 yards of existing 5" C.I. piping as the upper lengths feeding the Inter Chenna and Inter Ayarpatta Tanks at Rs. 1-4-0 per yard including jointing material	433
2. 918 yards run of 5" steel main suitable for 300 ft. head laid complete at Rs. 13 per yard	11,934
3. 346 yards of 6" C. I. S. and B. piping suitable for 300 ft. head at Rs. 16 per yard laid and jointed complete	5,536
4. Specials, valves, fittings and tank connections for above at Rs. 5 per cent. on Rs. 17,903	895
Total	18,798

G. MCC. HOEY.

Executive Engineer, 1st Sanitary Division,

Saharanpur.

The 29th July, 1919.